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COMMITTEE ON DIETARIES IN MENTAL
HOSPITALS.

REPORT

OF THE

DEPARTMENTAL COMMITTEE

Appointed to Inquire into Certain Matters
Relating to the Diet of Patients in County
and Borough Mental Hospitals.



SUBMITTED TO
STAFF DIETARY SECTION
I.S.S.C.

21 JUL 1924

CHAIRMAN'S
INITIALS

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INSUFFICIENT FOOD IN ASYLUMS.

REPORT OF COMMITTEE OF INQUIRY.

The Departmental Committee appointed to inquire into the diet of patients in county and borough mental hospitals issued its report last night. It recommends that there should be more uniformity in the construction of mental hospital dietary scales, especially in regard to the character of the food given, its total amount, the amounts of certain staple articles of diet and the avoidance of monotony.

It is further recommended that to ensure the presence in dietaries of necessary accessory food factors (vitamins) there should be a partial reinstatement of butter as a regular article of diet, a supply of milk in greater quantity, an increased provision of green and other fresh vegetables, a more common use of eggs, a free administration of salads and fresh fruit, and a more general use of wholemeal or germ bread. These improvements would be secured by the adoption of a suggested model dietary. Under proper conditions, the cost of this dietary at present prices should not exceed 8½d. per head per day for county mental hospitals, and 8¼d. for borough institutions.

On grounds of economy as well as efficiency it is urged that it is important:—

- (a) To establish a united food department in each institution, under a competent and responsible head, for dealing with the supply, cooking, distribution, and service of food;
- (b) To provide each institution with adequate kitchen equipment;
- (c) To endeavour to secure, as kitchen workers, the services of persons more highly skilled in cookery by making these posts more remunerative and attractive. This refers more particularly to the responsible head.

Substantial economies, the Committee think, could be secured by paying greater attention to the terms of specifications and contracts, and by taking more advantage of wholesale markets. Separate accounting, as between patients and staff, should be the rule in all mental hospitals.

The Committee expresses the view that insufficient attention is now paid to palatability and attractiveness of food, especially in the matter of variety. Some of the diets examined were inadequate, some excessive. There was an increased incidence of tuberculosis among males in the 12 institutions providing dietaries of the lowest arithmetical value.

More uniformity - avoid monotony - more butter
to milk, green & fresh veg., eggs, salads, fruit, wholemeal bread.
adopt our model dietary - unified food dept. under responsible
head - kitchen equip^t - better staff - Contracts - wholemeal milk.
exp^t also bet. parts & staff. Bd. of C^t have an Adviser -



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WARRANT OF APPOINTMENT.

I hereby appoint, with the approval of the Minister of Health :—

R. W. BRANTHWAITE, Esq., C.B., M.D., D.P.H., a Commissioner of the Board of Control ;

L. O. FULLER, Esq., L.R.C.P. (Lond.), M.R.C.S., Medical Superintendent, Three Counties Mental Hospital, Arlesey ;

W. J. GIBBS, Esq., Steward, Tooting Bec Mental Hospital ;

M. GREENWOOD, Esq., F.R.C.P. (Lond.), M.R.C.S., a Medical Officer of the Ministry of Health ;

P. T. HUGHES, Esq., M.B., C.M., D.P.H., Medical Superintendent, Barnsley Hall Mental Hospital, Bromsgrove ; and,

R. WORTH, Esq., O.B.E., M.B., B.S., Medical Superintendent, Springfield Mental Hospital, Tooting ;

to be a Committee :

To consider the dietaries in County and Borough Mental Hospitals, and to report what changes, if any, are desirable, and whether a minimum dietary scale should be fixed.

And I appoint :—

R. W. BRANTHWAITE, Esq., C.B., M.D., D.P.H., to be Chairman ; and HAROLD J. CLARKE, Esq., of the Board of Control, to be Secretary of the said Committee.

(Signed) F. J. WILLIS,

Chairman of the Board of Control.

March 26th, 1922.

The cost of the printing and publication of this report is estimated at £117.

COMMITTEE ON DIETARIES IN MENTAL HOSPITALS.

REPORT.

To Sir FREDERICK WILLIS, K.B.E., C.B.,
Chairman of the Board of Control.

We, the undersigned members of this Committee, were appointed by you

“To consider the dietaries in County and Borough Mental Hospitals, and to report what changes, if any, are desirable, and whether a minimum dietary scale should be fixed.”

As a preliminary measure, immediately after our appointment, we asked for and obtained copies of the dietary scales then in force in all county and borough mental hospitals. These were carefully examined, amended by correspondence where necessary, and expressed in terms of calorie values; the final results were submitted to the Quantitative Nutritional Committee of the Medical Research Council for an expression of opinion on their *prima facie* interpretation. We also obtained from medical superintendents of mental hospitals a statement as to the cost of all such dietaries.

Taking, as the basis for consideration, the accepted food requirements for normal adults, we then proceeded, by obtaining anthropometric measurements and other data, to ascertain how far these quantities were applicable to a population of persons suffering from mental disorder; subsequently checking our conclusions by special experiments in basal metabolism, made on our behalf at the Middlesex County (Springfield) Mental Hospital.

Such oral evidence, on definite points, as seemed necessary, was then obtained from the medical superintendents of some mental hospitals; from certain clerks and stewards deputed to provide us with information by the Association of Clerks and Stewards of Mental Hospitals; from the persons in control of kitchens in general hospitals; from the managers, engineers and cooks of large catering concerns, and from firms supplying kitchen equipment.

Visits were paid by the Committee, or by some of its members, to a number of mental hospitals, where enquiry on the spot seemed to be specially indicated; to one of the Metropolitan Asylums Board Hospitals; to the kitchens, stores and cold storages of St. Bartholomew's and King's College General Hospitals; and to modern catering establishments under the control of Messrs. Lyons and Co., the Gordon Hotels, Ltd., and the Midland Hotel Services. The chief reasons for these visits were to enquire into the value of certain varying methods in force in different institutions, and to acquire knowledge generally regarding kitchen equipment, the preservation of food, its

preparation for table in large quantities, and the means adopted for its distribution whilst hot to considerable numbers of persons.

We also requested Mr. S. J. Benham to enquire on our behalf (during a visit he made to the United States of America and Canada) as to whether he found, in mental hospitals in those countries, any arrangement for food preparation and distribution that might be worth consideration with a view to adoption in ours. Mr. S. J. Benham, who is a member of a well-known firm of domestic engineers, is thoroughly conversant with the apparatus now employed in the preparation, cooking and distribution of food in mental hospitals in England and Wales.

Having, in our opinion, arrived at a sufficiently advanced stage in our enquiry, we then prepared a model dietary which seemed to us to meet requirements and be free from the defects in existing scales. This was circulated to the medical superintendents of all mental hospitals, with a request for their suggestions for amendments, for estimates of the cost of adopting our model dietary and for details concerning their kitchen control and equipment. Replies were received from all to whom the circular was addressed, and very careful consideration was given to the resulting suggestions.

We have also carefully considered the question contained in our terms of reference as to whether a minimum dietary scale should be fixed.

Although our main object has been to suggest a dietary that shall be scientifically adequate for the maintenance of health and vitality, and at the same time be possible of adoption from a practical standpoint, the economic aspect of the question has not been overlooked. Attention has been given to the cost of the suggested new dietary, and every effort has been made to ensure that the average amount of money now expended on food shall not be materially exceeded by its adoption.

We have now the honour to submit our Report for your consideration, dealing with the subject of our enquiry on the lines indicated in the "Table of Contents" on page 2 hereof. In doing so we desire gratefully to acknowledge the assistance rendered us by those members of our Committee who have undertaken special work, and the help we have received from the staffs of the Ministry of Health (Section of Medical Statistics) and of the Industrial Health Statistics Committee (Medical Research Council) in carrying out most laborious arithmetical analyses. We are also greatly indebted to the medical superintendents of some mental hospitals for valuable suggestions, to the honorary secretary of the Association of Clerks and Stewards of Mental Hospitals for collecting information on our behalf, and for bringing before us a most useful deputation of some of its prominent members, and to individual engineers and stewards of mental hospitals who have given us the benefit of their skilled experience. The valuable assistance we received from the authorities of St. Bartholomew's and King's College Hospitals, and from Messrs. Lyons and Co., the Gordon Hotels, Ltd., and the Midland Hotel Services, was also much appreciated.

I.—DETAILS CONCERNING EXISTING MENTAL HOSPITAL DIETARIES.

Since the commencement of our enquiry, partly owing to some recommendations contained in the recently-published "Report of the Departmental Committee on the Administration of Public Mental Hospitals," and partly to the attention that has been drawn to the subject as the result of our many communications with medical superintendents, some improvements have been made in the feeding arrangements in a few institutions. Consequently the analysis of mental hospital dietary scales, appearing in Appendix A hereto (page 65) does not quite represent the conditions existing to-day. As, however, it proved impossible for us repeatedly to amend our figures whenever fresh information concerning changes came to hand; as the amendments or additions notified to us were in our view for the most part inadequate; and as they made little difference to the position when institutions were considered as a whole; we decided to adopt, as the basis for this Report, the particulars concerning dietaries that were received by us in reply to the circular letter we issued in March 1922. Moreover, we construe our reference as an instruction to consider the conditions existing at the time of our appointment.

At that time there were, in England and Wales, 97 county and borough mental hospitals. Two of those which had been used as war hospitals were still occupied by the Army authorities; the number of dietary scales received for consideration was, therefore, 95.

The general impression gained from our preliminary study of these documents seemed to show physiological sufficiency in a large proportion of cases; but the dietaries were capable of improvement in many directions. We found, *inter alia*, a surprising lack of uniformity in the principles governing feeding arrangements generally, and the construction of institution dietaries; marked monotony in very many cases; here and there some suggestion of inadequacy, with evidence, on the other hand, in certain instances of excessive supply, especially of particular articles, and too little ground for belief that sufficient attention had been paid to the adequate provision of those accessory food factors (vitamins) that are now regarded by the majority of food experts as essential to the maintenance of vigour, and power to resist disease.

Marked inequalities in the cost of food, sometimes difficult to explain, were also met with, and inability on the part of some managing authorities to provide us with definite details of the actual cost of food for patients, as distinct from that for staff, was an unsatisfactory feature.

The law as it stands at present (53 Vict., ch. 5, s. 275 (6)) places upon each statutory committee of visitors the duty of determining the diet of patients detained in each county and borough mental hospital. It is not surprising, therefore, that diets vary in different places. These variations, indeed, were not only evident between single institutions serving a whole county (in some cases two

or three counties), but in borough mental hospitals contiguous to other institutions serving the remainder of the geographical counties of which the boroughs formed part. The same inequalities were evident in some large counties maintaining two or more institutions supervised by separate visiting committees.

These criticisms are, of course, subject to exceptions. The London County Council, for example, has for some time past shown a strong tendency towards unification of procedure in matters relating to the dieting of patients in the mental hospitals under their control, a tendency that has been very materially developed by recent action. There is also some evidence of co-operation, although not on such advanced lines, in one or two other county institution groups. Co-operative action at any rate renders probable a thorough ventilation of every branch of the subject, and secures discussion on all-important points between the committees and medical superintendents of different institutions. Experience fully detailed, and thoroughly considered, must eventually lead to improvement. We are of opinion that most of the variations in feeding arrangements, and defects in dietary construction, that now exist, are the direct result of work in watertight compartments, and that most of these inequalities would have disappeared long ago had more opportunity been afforded for co-operation between the responsible heads of all institutions.

All matters of importance that relate to feeding arrangements, especially where diversity in procedure exists, will be dealt with in detail later; but the mention of a few here will suffice to illustrate the point under consideration. *Kitchen management*—in the hands of the steward in some institutions, under the control of the matron in others, undertaken by a housekeeper in a third group, and left almost entirely to the cook in a fourth. *Kitchen equipment*—well considered with good results, by some authorities, and (under a mistaken idea of economy) neglected by others, to such an extent that nothing can be done in the department but routine cooking of the plainest possible character, entailing an unnecessary amount of labour with indifferent results. The question of *ward as against central feeding*, upon which we find great diversity of opinion and practice. The methods adopted for the *carving and distribution of food*—well carried out in some hospitals and indifferently in others. Other subjects calling for equalisation in procedure are the *differential dieting of the worker and non-worker* respectively; and the *treatment of the sexes* in the matter of food quantities—dealt with in most institutions with reasonable care, but in others without any guiding principle that is apparent.

When we come to the construction of dietaries it is only necessary to study the details set out in Appendix A (page 65) in conjunction with the tables annexed thereto, to realise the varying views taken by different authorities as to what is considered suitable food for patients.

Amongst the dietary scales we found a majority that were good and apparently sufficient, from a physiological standpoint; a number not so good, without actually being insufficient, and a few that might reasonably be described as inadequate. All the scales provide

for three chief meals each day—breakfast, dinner and tea—some giving extra food in between for workers, others a larger quantity of some articles at ordinary mealtimes for these patients, and a third group making no difference in diet between workers and non-workers. Light suppers, in a very few instances, are provided for those patients who are permitted to sit up after the usual hour of retirement.

Of the total number of breakfasts (34,675) served in 95 mental hospitals during a year, about 48·5 per cent. consist of a beverage with bread and margarine only, and, in a further 33·3 per cent. porridge is added to (or substituted for part of) the bread and margarine. In 3·9 per cent., jam, marmalade or syrup is given (often in substitution for margarine), and in 14·3 per cent. a savoury dish consisting of bacon, sausage of some kind, tinned meat, fish, or cheese, is provided in addition to the margarine, or in substitution for part of it. The fact that nothing in the shape of solid food, except bread and margarine, is given for breakfast throughout the year in 25 institutions, and that, conversely, 21 others find it possible to provide varied dishes in sequence—porridge, jam or its like, a savoury meat or fish course, or cheese—daily (to supplement the bread and margarine) and that some others can provide these dishes two or three times a week, is a good illustration of that diversity of practice to which we are now referring.

Bread issued to patients is, for the most part, made from pure white wheaten flour deprived of embryo and all offal. The supply for breakfast varies, for men, from 9 ozs. at one institution to $3\frac{1}{2}$ at another, and for women from 8 ozs. at four hospitals down to 2 ozs. at one. In regard to the lower figures it should be noted that, in general, porridge is supplied also; but, should this be unconsumed owing to dislike, frequency of issue (it is a daily issue throughout the year in some places), or insufficiency of milk or other adjunct, the bread allowance becomes inadequate. The average amount of bread provided for breakfast is approximately 7 ozs. for men and 5·2 ozs. for women. The amount of margarine provided varies from $\frac{1}{5}$ oz. to $\frac{3}{4}$ oz., with an average of about $\frac{1}{2}$ oz.

The bread allowance for the tea meal varies in different institutions from 10 ozs. down to 5 ozs. for men, and from 8 ozs. to $3\frac{3}{4}$ ozs. for women, with an average of 6·9 ozs. for the former and 4·9 for the latter sex. The figures given for the margarine supply for breakfast apply also to the tea meal. A beverage with bread and margarine is the only food given in 49·5 per cent. of all teas supplied throughout a year in mental hospitals. This cannot be regarded as satisfactory in view of the fact that this meal is, in general, the only one provided between dinner (usually at 12.30 to 1 p.m.) on one day, and breakfast (at 7.30 to 8 a.m.) the following morning. Jam, marmalade, treacle or honey is supplied for tea at 59 hospitals from once to three times weekly; but at 36 institutions these articles of diet are not given throughout the year. Cheese is provided for this meal from once to five times weekly at 14 hospitals, and meat or fish paste from once to four times weekly at five institutions. Cake forms part of the tea meal at only 13·2 per cent. of all teas provided throughout the year,

at a few institutions with some approach to regularity, but in the majority rarely or not at all.

A few institutions provide a choice of two or three beverages for breakfast and tea, or supply a change by rota ; but by far the largest number issue one beverage for each meal all the year round, the most common combination being cocoa for breakfast and tea for the evening meal.

From a physiological standpoint we consider that the dinners given in mental hospitals are on the whole good in quality and sufficient in quantity. This in any case is true so far as meat and vegetables are concerned. Fresh meat forms part of the dietary in 81·1 per cent. of all dinners provided throughout the year, tinned meat in 5·6 per cent., and fish in 7·3 per cent., so that 94·0 per cent. of all dinners include a main dish consisting of one or other of these articles of food. Of the 81·1 per cent. of fresh meat dinners, 43·2 per cent. are in the form of roast or boiled joints, and 37·9 per cent. soup, stews, pies or other made dishes.

Potatoes are given in 93·1 per cent. of all dinners, dried vegetables in lieu of potatoes in 6·6 per cent., and, in addition to potatoes, in a further 3·4 per cent. Green fresh vegetables are supplied at 67·2 per cent. of all dinners.

Comparing one institution with another, the chief variation in the dinner meal consists in the provision or otherwise of a second course, in which detail there is great difference in practice. Eleven hospitals supply a second course of pudding or cheese every day during the year, and five on six days each week. Twenty make this provision from three to five times weekly, 41 on one or two occasions only each week, one "about fortnightly," and in 17 institutions no second course is given all the year round. Two courses—meat with pudding or cheese—are served in only 39·9 per cent. of all dinners provided throughout each year in mental hospitals, therefore no second course appears at 60·1 per cent. of such dinners.

The managing authorities of four institutions adopt the principle of a 28 days' rota of food ; carefully planning meals with a dual purpose in view—securing the greatest possible variety in substance, and taking pains to prevent any particular article of diet becoming associated with any particular day. No patient detained in any of these places can, on rising in the morning, anticipate the constitution of that day's dietary. At the conclusion of four weeks the scale is rearranged, and a fresh start made with altered sequence, and changes contingent on season. Another hospital approaching this excellent arrangement carries out the same principle on a 21-day, and a further three on a 14-day basis. Some 15 to 20 others consider each week separately, arranging at the commencement the sequence of food for the succeeding seven days. In this case the "15 to 20" is approximate, the data available being insufficiently full for definite statement. With some exceptions it seems probable that these weekly selections apply more to dinners than to other meals ; indeed, it is clear, in some cases, that the variation is confined to a change in meat dishes only, the change resolving itself into the day in each week upon which is given roast or

boiled meat, soup, meat pie, hot-pot or stew, fish, or preserved meat, the breakfasts and teas remaining unaltered.

Granted, however, that all the above are material variations, there remain a considerable number of dietaries, good enough in some cases from a physiological standpoint, that are nevertheless monotonous in the sequence of their constituent items. Nearly all these remaining dietaries are, in fact, arranged on a fixed scale, setting out the food for seven successive days, which is repeated week after week throughout a year, with little or no modification—at any rate so far as the staple articles of diet are concerned. Some of them, of which the examples shown on pages 76–78 are representative, are too obviously monotonous to require much comment, especially in regard to breakfasts and teas. The only variations consist in a different meat dish for each day in the week, the advent of which can be foretold with accuracy, and, in one of them, a pudding for the Sunday dinner made from surplus bread collected during the previous week, with some jam, marmalade, or currant loaf for tea on the same day. The absence (with the exception of the bread pudding just mentioned) of a second course, already referred to as a condition that applies to over 60 per cent. of all dinners served in mental hospitals, is another factor that conduces to monotony. Amongst those institutions, however, that do supply a second course is one that provides a milk pudding daily with unbroken regularity week after week.

Fish appears on the dietary scales of 49 hospitals, but in seven cases only is there any variation in the method of cooking. With these exceptions this food is supplied to patients either steamed or boiled at every issue. In 46 hospitals fish is not given at all (except on Good Friday and as medical extras) and only appears on the table in 7.3 per cent. of all dinners throughout the year.

Before leaving the subject of variation in the construction of dietaries, it is necessary to draw more particular attention to the inequalities that have become evident in regard to the quantity of some of the most important foods supplied to patients.

Reference has been made already to the great difference that exists in the amount of bread provided—a variation that is not always dependent upon the supply of other articles. If for males 9 ozs. is a necessary ration for breakfast, and 10 ozs. for tea, in some institutions, it becomes difficult to justify such small allowances as $3\frac{1}{2}$ ozs. and 5 ozs. respectively in others, unless it is possible to guarantee that a porridge (or other) substitute, when given, is consumed by all. In most dietaries in which the smaller amounts appear no provision is made for an increased amount of bread should the substitute be refused. This would not be so important if such substitute varied daily and was only occasionally refused, but becomes very important when the only substitute happens to be one that is regularly refused by some, if only a few. The reverse also obtains; if the smaller amounts are sufficient then the larger ones are certainly excessive. The probability that the latter is the case seems to receive support from the fact that one or two institutions providing a comparatively large amount of bread (8 ozs. or more for both breakfast and tea) look to a week's accumulation of

unused material to provide them with a bread pudding for dinner on Sunday, or trust to a surplus over the amount needed for breakfast and tea for the provision or otherwise of dinner bread. We do not regard either of these arrangements as satisfactory.

In some hospitals no margarine is issued when meat of any kind, paste made with meat or fish, or jam is provided for breakfast or tea, and in one, at least, one-fifth of an ounce only is supplied as a regular ration. The average and most common issue is $\frac{1}{2}$ oz., but this is increased in some institutions to $\frac{3}{4}$ oz. The difference between $\frac{1}{2}$ and $\frac{3}{4}$ oz. is a material one.

We find it very difficult to estimate the exact amount of meat supplied to patients at midday meals, as so many different methods are employed in the calculation of rations. Some authorities base their issue on the weight per head of raw meat with bone, as received from the contractor; others on uncooked meat without bone; others again, on cooked meat with bone, weighed before carving; and the remainder on cooked meat without bone, weighed as finally served and ready for consumption. The method first mentioned is used by the majority, the remainder being about equally in favour. Inequality in supply, however, with which we are at present concerned, is evident in all of them, as will be seen by the following table:—

Meat weighed as	Purpose.	Amounts issued.				Approximate average issue.	
		Maximum.		Minimum.			
		M.	F.	M.	F.	M.	F.
Uncooked, with bone	Roast or boiled joints ...	Ozs. 8	Ozs. 7	Ozs. 3½	Ozs. 3	Ozs. 5.2	Ozs. 3.9
Do.	Soups, pies, stews, etc. ...	6	5	2	1½	3.5	2.9
Uncooked, without bone	Boneless joints, stews, etc.	6	5	2	2	3.7	2.9
Cooked, with bone	Roast and boiled joints (weighed before carving)	5	5	3	2½	4.0	3.5
Cooked, without bone	Roast and boiled joints (weighed after carving)	6	5	2	2	3.7	3.0

Some of the maximum figures are unnecessarily large, and some of the minimum much too small.

The allowances of soup vary from $\frac{3}{4}$ pint per head to 2 pints for both sexes, and the amount of stews served with vegetables from 16 fluid ozs. to 30 for males and from 13 to 30 for females. The minimum ration of cooked fish is 6 ozs. for males and 5 ozs. for females, up to a maximum of 10 ozs. for both sexes; and of uncooked fish from 10 to 16 ozs. for men, and from 8 to 16 ozs. for women. The supply of meat pies

cooked and served with vegetables varies from 9 to 20 ozs. for males and from 8 to 17 ozs. for females.

The quantities of solid puddings, of the plain suet, raisin or currant variety, show even a wider range; in some institutions the ration of these foods is as low as 3 ozs. for both sexes, whilst in others it is as high as 16 ozs. for men and 12 ozs. for women.

Great differences are evident between the formulæ used for the preparation of beverages, meat stews, meat pies, soups, suet puddings, milk puddings, and suchlike composite dishes. In many cases some of the ingredients used are excessive in quantity, and not in good proportion. It seems certain that the adoption of common formulæ for the preparation of such foods, all over the country, would result in more palatable dishes and effect a considerable saving.

THE PHYSIOLOGICAL SUFFICIENCY OF EXISTING MENTAL HOSPITAL DIETARIES.

The means available for the quantitative estimation of food values are so limited that we felt our enquiry would be incomplete unless advantage were taken of every source of information that might afford us any assistance in arriving at definite conclusions. To this end we directed close attention to the possibility of estimating the comparative nutritive and heat-producing values of all mental hospital dietaries.

In order to obtain expert assistance in this somewhat difficult phase of our enquiry and ensure an unbiassed result, we asked for and obtained the services of the staff of the Section of Medical Statistics of the Ministry of Health, to whom we submitted the dietary scales received by us for an estimation of each in terms of proteins, fats, carbo-hydrates and calorie values. The work proved to be one entailing great labour, and the result is a model of accurate statistical analyses so far as the material permitted.

Unfortunately, however, in a large number of dietary scales, the data were insufficiently definite to enable correct estimates to be prepared. Exact analysis proved to be impossible in the case of those hospitals that supplied a "sample" rather than an actual scale, covering seven days only, without any information being provided as to variations for other weeks. The occurrence also of indefinite details in a large number of cases added to the difficulty—such, for example, as "bread *ad lib.*," "bread according to needs," "extra bread as required," "puddings daily" (without details as to constitution or quantity provided), "vegetables *ad lib.*," "vegetables when in season," "vegetables when grown on the farm," and so on. Although attempts were made to remedy these defects, the ultimate result remained unsatisfactory. Moreover, strictly speaking, the calorie value of a dietary should be estimated not upon the food provided but upon that actually consumed, and we were unable to find any institution where a complete series of experimental deductions for waste had been made, in order that the difference between the amount provided and that consumed might be determined.

The complete analytical tables as presented to us by the Section of Medical Statistics of the Ministry of Health accurately represented the arithmetical values of the dietary scales supplied to them for analysis, when quantities were definitely stated, and (so far as estimations were possible) by calculation and the application of average values when exact details in this respect were not forthcoming. A cautionary note, however, was added to the effect that there were many indications that implied a possibility that the diet scales did not in all cases represent the actual amount of food supplied, and that the estimated quantities of particular articles (when exact details were unobtainable) might be open to question.

Having regard to these circumstances, and to the fact that no clear relation could be found between calorie values, as shown by the statistical tables, and the body weight of patients (see, however, Appendix B for criticism of the anthropometric data) we considered it unsafe to draw definite conclusions from them on the evidence of the arithmetical value of paper diets alone.

Notwithstanding this, the statistical tables as a whole have proved of some value as confirmatory evidence in cases where other indications suggested inadequacy or excess, and we have limited their use to this purpose.

The accompanying table illustrates the position by showing the arithmetical values of 24 dietaries for male patients—12 of the lowest in calorie value and a similar number of the highest. In the majority of cases in each class the arithmetical deduction confirmed our estimate (arrived at on general grounds) of the dietetic values of the food scales to which they refer.

FOOD VALUES OF MENTAL HOSPITAL DIETARIES.

(In order of Calories as regards Non-workers.)

Males.

		Non-workers.				Workers.			
		Pro- tein.	Fats.	Carbo- hy- drates.	Energy value, per lb.	Pro- tein.	Fats.	Carbo- hy- drates.	Energy value, per lb.
GROUP I—		Grms.	Grms.	Grms.	Cals.	Grms.	Grms.	Grms.	Cals.
No. 1 ...		57.4	64.8	205.0	1,678	76.4	80.4	287.3	2,238
„ 2 ...		53.8	54.9	274.4	1,856	66.0	64.7	308.0	2,134
„ 3 ...		62.3	55.5	311.9	2,050	77.3	64.2	367.0	2,417
„ 4 ...		51.4	73.6	299.4	2,122	71.4	92.0	404.1	2,806
„ 5 ...		66.5	52.2	340.0	2,152	83.6	62.8	407.1	2,596
„ 6 ...		66.6	72.3	299.6	2,173	89.7	90.3	387.9	2,798
„ 7 ...		68.3	67.8	308.3	2,175	74.5	82.2	348.4	2,498
„ 8 ...		64.1	61.0	331.3	2,190	90.7	111.4	386.2	2,990
„ 9 ...		67.5	59.0	344.5	2,238	82.5	69.7	398.0	2,618
„ 10 ...		71.9	60.6	336.7	2,239	80.5	66.0	371.1	2,465
„ 11 ...		65.1	69.2	325.0	2,249	72.1	77.3	381.3	2,577
„ 12 ...		68.3	72.0	319.7	2,261	(no details)			
Mean ...		63.6	63.6	308.0	2,115	78.6	78.3	367.9	2,558

—	Non-workers.				Workers.			
	Pro- tein.	Fats.	Carbo- hy drates.	Energy value, per lb.	Pro- tein.	Fats.	Carbo- hy drates.	Energy value, per lb.
GROUP II—	Grms.	Grms.	Grms.	Cals.	Grms.	Grms.	Grms.	Cals.
No. 84 ...	84.5	101.3	389.5	2,886	99.5	111.9	451.9	3,302
„ 85 ...	77.8	94.6	421.3	2,926		(no det	ails)	
„ 86 ...	88.6	91.2	423.6	2,949		(no det	ails)	
„ 87 ...	79.5	85.5	454.1	2,983		(no det	ails)	
„ 88 ...	81.2	92.1	452.4	3,045	105.6	113.0	569.5	3,820
„ 89 ...	101.2	76.8	468.4	3,050	120.7	95.2	505.8	3,455
„ 90 ...	88.4	106.3	419.8	3,072		(no det	ails)	
„ 91 ...	90.1	99.4	451.3	3,144	105.1	108.0	506.4	3,512
„ 92 ...	96.3	77.7	497.4	3,157	112.9	88.5	555.9	3,565
„ 93 ...	83.4	89.0	503.8	3,232	98.0	99.1	558.8	3,611
„ 94 ...	96.1	93.7	502.5	3,326		(no det	ails)	
„ 95 ...	73.7	77.8	570.7	3,365	88.9	95.0	701.3	4,122
Mean ...	86.7	90.5	462.9	3,095	104.4	101.5	549.9	3,627

Despite the necessity for caution, it is impossible for us entirely to ignore the great differences between the arithmetical food values of the two groups in the table in question, having regard to the certainty that the same method was employed in compiling both. We cannot, in fact, regard indeterminate differences, often of minor details, as entirely responsible for the divergence between these groups, and cannot help entertaining a suspicion that the supply of food is inadequate in those institutions included in the first of them.

This suspicion is appreciably strengthened by the result of the following investigation. After the dietetic analysis had been completed we desired the statistical department of the Board of Control to prepare a return of the number of new cases of Tuberculosis reported, and of the number of deaths from Tuberculosis recorded in males, during the last two years in the 12 institutions comprising each group respectively. The result is set out as follows :—

INCIDENCE OF, AND MORTALITY FROM, TUBERCULOSIS DURING THE TWO YEARS JULY, 1921–JUNE, 1923, IN CERTAIN MENTAL HOSPITALS.

Grouped according to the Calorie value of their Dietaries (Non-workers).

—	Number of Mental Hos- pitals.	Males.				
		Average Number of Patients resident.	New Cases Noti- fied.	Deaths.	Ratio per 1,000 resident.	
					New Cases.	Deaths.
I.—Dietaries of low- est Calorie value	12	11,330	237	143	20.9	12.6
II.—Dietaries of high- est Calorie value	12	12,853	198	127	15.4	9.9

It will be seen that when either notified cases or deaths are related to the average population, the institutions with unsatisfactory paper diets compare unfavourably with those showing adequate paper diets. We are alive to the danger of basing conclusions upon a short experience, but calculations we have made render it improbable that such a discrepancy as shown is a mere freak of random sampling. On the average so great a discrepancy as is shown between case rates would only arise by chance less than once in 500 trials, while the odds against the discrepancy in death rates, although much smaller, are substantial, somewhere about 19 to 1. We are aware that both the incidence and fatality of tuberculosis are much affected by the age and sex composition of the population exposed to risk, but there is no reason to suppose that the institutions with a low diet (as recorded) differ in these respects materially from those reporting a more satisfactory diet. Having regard to the known relation between insufficient feeding and tuberculosis, we are entitled to conclude that the statistics of case incidence and deaths provide a certain support to the *primâ facie* suggestion of the arithmetical analysis, that in a minority of institutions the position is not satisfactory.

The conclusions we have ourselves reached received some confirmation from expert authorities. The complete analysis of all the mental hospital dietaries was submitted, merely as a statistical document, to the Quantitative Nutrition Committee of the Medical Research Council for an opinion as to dietetic value. This Committee, which includes some of the highest authorities on the physiology of nutrition, was of opinion that if the lower figures did really measure the actual food supplies in certain of the mental hospitals, they were unsatisfactory. These authorities, of course, could only express an opinion from consideration of the statistics presented to them, having no knowledge whether or not the diet scales, on which such figures were based, indicated the actual amounts of food provided.

On the whole, therefore, while we do not regard our statistical data as sufficiently reliable to serve as a basis for definite conclusions, still less as grounds for individual censure, we consider they have some value for confirmatory purposes, and that they suggest a deficiency of food supply in some hospitals. Indisputably they lend further support to our contention that there is an undesirable disparity in the construction of diet scales throughout mental hospitals.

ACCESSORY FOOD FACTORS (VITAMINS) AND MENTAL HOSPITAL DIETARIES.

During our detailed examination of mental hospital dietaries we have had before us a "Report* on the Present State of Knowledge concerning Accessory Food Factors (Vitamines), 1921," compiled by

* After this section of our Report was written, the Committee upon Accessory Food Factors (Vitamins) published an enlarged and amended edition of the monograph here referred to. The majority of the quotations, however, from their original edition, which have been used by us, and upon which we have largely based our conclusions, are either actually or in effect reproduced in the second edition. When difference between the two editions exists this will be indicated.

a Committee appointed jointly by the Lister Institute and the Medical Research Council.

Stimulated by the occurrence of diseases, obviously or apparently due to food deficiencies, research workers in many parts of the world have been endeavouring, during recent years, to ascertain what foods (or active principles in foods) are essential to the maintenance of health and vigour. The results of these investigations seem to leave no doubt that deficiency, in certain accessory factors of the vitamin type, plays a fundamental part in the etiology of disease. The Report in question presents "in a collected form the essential facts concerning these accessory substances, so far as they are at present known," together with details of corroborative experiments carried out for the purpose of the monograph, thus making readily accessible information that is capable of practical application.

We are aware that this Report has been subjected to criticisms from time to time; but we have seen nothing in these that is sufficient in our opinion to throw grave doubt upon, or satisfactorily explain in other ways, the main conclusions arrived at by the compilers. On these grounds we have decided to adopt it as the standard work on the subject, and to attempt, so far as is possible, to estimate the vitamin sufficiency of mental hospital dietaries, in accordance with the principles therein contained.*

Accessory food factors are widely distributed amongst naturally occurring foodstuffs, and, under the normal conditions of free life (*i.e.*, when choice of diet is unrestricted) it is probable that the variety of food consumed ensures protection from the risk of any deficiency in these essential substances. But, ill-effects from deprivation at once become evident when any conditions of life involve lack of the particular foods containing one or more of the known accessory substances. Many historic instances of widespread definite diseases, caused by such deprivation, are on record—outbreaks, for example, of beri-beri and scurvy, and the undue incidence of rickets. Short of this, however, we think it not unreasonable to assume that partial deprivation of these essential factors may lead to conditions of ill-health less clearly defined, consequently less easily attributable to particular causes, or may induce lowered vitality and impaired resistance to the invasion of disease. For instance, in any community where the dietary is strictly controlled, and perhaps insufficiently varied; where the need for economy indicates the substitution of materials of secondary for those of primary value; and where individual tastes and desires for particular foods (often created by body needs) must be more or less ignored, the possibility of danger is obvious—unless great care is exercised in the provision of vitamin-rich foods in sufficient quantity to leave a margin for reserve.

No knowledge exists concerning the actual nature of accessory food

* We do not, of course, suggest that vitamin deficiency is (apart from energy—insufficiency) the only factor of malnutrition; but it is not within the terms of our reference to discuss other than dietetic factors. A full account of recent work is to be found in R. Rössle's monograph "Wachstum und Altern" (*Ergeb. d. Allgem. Path.* 20th J. ii 1923, p. 369).

factors, nor can we form even an approximate estimate as to the amount of each that is requisite to maintain health. All that can be said at present is that "if minute amounts of certain constituents are removed from natural foods, such foods wholly fail to support nutrition, and grave symptoms of actual disease may supervene. The failure and the symptoms may be prevented—or the animal restored to health—by the replacement of what was removed from the foods, or by adding an equally small supply from other sources."*

"Although there are reasons for believing that the adult has smaller requirements for the accessory substances than the growing child, the beneficial influences of a liberal supply cannot be denied."†

Practically all investigators in this field of research have now admitted their belief in the indispensability of the two accessory factors, fat-soluble A. and water-soluble B., for the growth and nutrition of the animal organism. It is probable also that a third factor, the anti-scorbutic substance, should be added as a further essential to perfect metabolism; each of the three members of the class possessing its own special function in nutrition. So far as their origin is concerned, "there is evidence to suggest that they are formed only in the tissues of plants, whence they pass into the tissues of herbivorous animals and thus become available for carnivora."

"If, however, the evidence for the existence and importance of vitamins had arisen entirely from the study of deficiency diseases our views might have remained too limited, too much confined to the standpoint of pathology and therapeutics. But in the very years during which the etiology of beri-beri was being cleared up and the suggestion established that a quantitative food deficiency may be responsible for striking symptoms, experiments were in progress on quite independent lines to show that something other than a supply of energy and protein is required to maintain so fundamental a physiological phenomenon as growth, and to demonstrate *that normal metabolism as a whole is not possible* without the influence of food constituents which, because of their minute amount, could justifiably be spoken of as 'accessory' factors in nutrition."‡

Fat-soluble A. (the growth§ or anti-rachitic factor) is found in green leaves and in the embryos of many seeds. Its presence "was first detected in butter and egg-yolk, and, as far as is at present known, these foodstuffs represent the richest sources of that substance."|| It

* Second edition, page 1.

† Second edition, page 117.

‡ Second edition, page 3.

§ The second edition (page 81) throws some doubt upon the identity of vitamin A and the anti-rachitic factor, implying the possibility of these being separate factors with similar distribution. All that is definitely affirmed is that an anti-rachitic factor, concerned with the calcification of bone, similar in many respects to vitamin A, is a central factor in the machinery of rickets.

|| Modified in the second edition as follows (page 19): "The presence of the fat soluble factor was first detected in butter and egg-yolk, but by far the richest sources have been found in cod-liver oil and the liver oils prepared from allied fish such as coal-fish. Vitamin A has also been found in many other oils and fats derived from the animal kingdom, as, for example, sahrk-liver oil, beef fat, the fats of kidneys, heart muscle and liver tissues, herring oil, cod oil, salmon oil, and whale oil."

has also been found present in many oils and fats derived from the animal kingdom, as, for examples, cod-liver oil, beef and mutton fats, the fats of kidneys, heart muscle, liver tissues and herring oil. "On the other hand, the following oils and fats, all with one exception derived from plant sources, contain only small amounts or are deficient in the accessory factor :—Sunflower-seed oil, corn oil, olive oil, cotton-seed oil, almond oil, arachis or peanut oil, linseed oil, coco-nut oil, and lard." It is for this reason that the cheaper makes of margarine, prepared almost entirely from vegetable fats or lard, possess no value from a fat-soluble A. point of view.

"It was at one time generally believed that the fat-soluble accessory factor was comparatively stable to heat." More recent work has, however, cast some doubt on this; indicating that "the fat-soluble accessory substance is gradually destroyed at 100° C., and that four hours' exposure to that temperature is sufficient to render butter fat of little greater vitamin value than an equivalent quantity of lard." Later experiments seem to indicate a probability that exposure to air during the application of heat is more responsible for this destruction than the heat itself.

Water-soluble B. (anti-neuritic or anti-beri-beri factor). The plant kingdom also provides the primary source of the water-soluble factor, the power to synthesise it being possessed generally by plants, even by some which appear low down in the natural classification. "Thus, for example, yeast constitutes one of the richest known sources of the substance." This accessory factor is widespread in distribution, and is found in almost all natural foodstuffs, its principal sources being the cereals, edible pulses, and the eggs of birds. In the case of the cereals an interesting differentiation has been established between the different constituents of the grain, the largest deposit of this factor being found in the embryo, or germ, the bran coming next in order of importance. "The endosperm, especially when deprived of the *aleurone layer* (as is customary in the preparation of white wheaten flour or 'polished' rice) is deficient in the anti-neuritic factor." The foodstuffs next in importance to the cereals, so far as this factor is concerned are the pulses. Dry peas and lentils are found to occupy a high position in this respect.

This substance "withstands desiccation for long periods of time, as may be appreciated from the fact that its principal sources are found in dry foodstuffs. Its resistance to heat is also considerable."* Recent experiments have shown that destruction "takes place very slowly at 100° C., but is much more rapid in the neighbourhood of 120° C. In the baking of bread or biscuit, therefore, during which process the interior of the material does not rise above 100° C., no serious diminution in this vitamin need be apprehended."† "This proved to be true in the case of pigeons, which thrive well upon a sole diet of wheaten biscuit made from whole-meal flour."

Absolute deprivation of water-soluble B. leads to immediate cessation of growth in young animals, and gradual wasting followed

* Second edition, page 45.

† Second edition, page 46.

by rapid decline to a fatal termination in both young and old. Polyneuritis in birds is attributable to absence of this factor as, is also, beri-beri in man.

The Anti-Scorbutic Substance.—"This vitamin (c), necessary in a diet for the prevention of scurvy, is found in fresh vegetable tissues and (to a much less extent) in fresh animal tissues. Its richest sources are such vegetables as cabbage, swedes, turnips, lettuce, watercress, and such fruits as lemons, oranges, raspberries and tomatoes. Inferior in value are potatoes, carrots, french beans, scarlet runners, beetroot, mangolds, and also (contrary to popular belief) lime juice."*

Although we have endeavoured to find definite pathological evidence to justify our suspicion that, despite chemical sufficiency of protein and calories, vitamin deficiency exists in some mental hospital dietaries, we frankly admit that any evidence we have been able to obtain in support of inadequacy in this respect is indirect or circumstantial. We have discovered no instance of extreme deficiency of any one of the three factors in any institution dietary we have examined, and, in consequence, we have found no absolute proof of shortage in fat-soluble A.; no beri-beri (except an imported case or two), and no scurvy have been observed.

Notwithstanding this, having regard to our previously-expressed conviction that partial deprivation of these essential factors may lead to conditions of ill-health less clearly defined, we consider that indications are present that at any rate suggest the probability that some of the existing scales contain less of one or other of these essentials than is desirable, pointing to the necessity for closer attention to vitamin provision. Indeed, we are of opinion that the possibility that a definite failure of nutrition and general impairment of health may result from a deficiency considerably less extreme than is required to produce the typical results of absolute deprivation should always be kept in mind.

When we come to estimate the relative importance of the three accessory factors, in regard to mental hospital dietaries, we think that the third in order of mention—the anti-scorbutic substance—may be practically eliminated from further consideration. Although, during many years, a few medical officers have now and again been called upon to treat cases of scurvy (or more often the mild disturbances that might or might not be allied to this disease) the evidence obtainable relating to such conditions—owing to rarity, the time that has elapsed since occurrence, and the difficulty in diagnosis—is extremely vague and unreliable. All indications seem to point, in the few known or suspected cases, to the presence of the disease on admission, in contradistinction to development during residence, and to early recovery on ordinary institution diet. The statistical department of the Board of Control has no record of a single death from scurvy in any mental hospital during the last 10 years. This result might be anticipated, seeing that in the least varied dietaries, even in those that are apparently

* Further research has resulted in the presentation of much valuable information concerning vitamin C in the second edition. For reasons given later we consider it unnecessary to refer to these in detail.

deficient from a quantitative point of view, fresh green vegetables, potatoes, or fresh meat are given daily, and in sufficient quantity to render the occurrence of scurvy, or even a tendency to that disease, improbable. In other words, the adequate supply of materials containing the anti-scurvy vitamin probably compensates for any partial destruction of the factor that occurs in cooking.

This conclusion is based upon the assumption that the action of the anti-scorbutic substance is a specific one. Whether or not a larger quantity than is now supplied in mental hospital dietaries is necessary, in order that some more general purpose in metabolism may be served (in conjunction with the other two factors) is a question that cannot be answered at present, having regard to our strictly limited knowledge of the properties and action of these substances.

In assessing the general state of nutrition of the population of mental hospitals, we must always remember that this population is differentiated from the general population in a peculiar way. This is not the place to discuss the respective shares of heredity and environment in the genesis of mental disease, but it is certain (1) that the average anthropometric characters of mental hospital patients differ from those of the general population; and (2) that there is an inter-relation between psychological and physiological abnormalities. With regard to (1) our own observations (*see* Appendix B) agree with those more extensive studies of earlier writers which made it appear probable that the "insane population" is on the average of retarded growth; with regard to (2), all psychiatrists and neuro-pathologists would accept the following remark of Allers:—"In long continued states of depressive affect, the whole of the processes of digestion are seriously impaired, although we cannot assert positively that it is the state of melancholia which causes the digestive inertia; perhaps both factors, the psychological anomaly (*Verstimmung*) and the disturbance of digestion are produced by a third common factor. That the common hypochondriacal delusions of melancholics are associated with digestive disturbances is hardly doubtful. Again the multifarious hypochondriacal fancies of neurasthenics may be in part associated with real (secondary) changes in the abdominal viscera; it is admitted of course, that for the most part, they are purely conceptual (*vorstellungsmässig*)."*

We should therefore expect to find, and do in fact find, much disorder of assimilation and general metabolism even in mental hospitals furnishing diets which, from the physiological standpoint, are thoroughly satisfactory. Whether under these apparently ideal conditions, some advances might not be made at the cost of more research into the general metabolism of persons suffering from different and contrasting forms of mental disease, and whether the actual provision of facilities for such research in our public mental hospitals are adequate, are questions beyond our terms of reference. We can only deal with one element of the general problem, viz., the actual provision of diets, and must only inquire whether the quantitative and qualitative composition

* R. Allers—*Abnormität der Beziehungen zwischen den seelischen und körperlichen Vorgängen*—*Kafka's Handbuch der Vergleichenden Psychologie*, Munich 1922, Vol. 3, p. 129.

of a diet offered to a population admittedly prone to metabolic disturbance, admittedly very subject to bodily disease, is defective.

Although, as we have pointed out, we have no conclusive evidence, we submit that there are indications that in some mental hospital dietaries, there is a relative vitamin deficiency, probably of fat-soluble A., possibly of water-soluble B.

We have already seen that fat-soluble A. has its origin in the green leaves of plants, whence it passes by ingestion into the fat tissues of animals and birds, incidentally enriching with this vitamin their milk and eggs. It is obvious, therefore, that the richest dietetic sources of this accessory factor are green vegetables, milk (or butter derived therefrom), eggs, the flesh of herbivorous animals, and fish. But, in estimating the value of these articles of food, as they are provided for consumption, there is a serious element of uncertainty that must be considered—the extent to which the vitamin in some of these foods is destroyed or rendered less valuable by subjection to heat during ordinary culinary operations.

Earlier in this section of our Report we have indicated the extent of our present knowledge concerning the effect of heat upon the fat-soluble factor, which we admit is too indefinite to enable us to estimate, even approximately, the destruction that occurs in the kitchen. Joints, poultry, meat pies, etc., are usually cooked in gas ovens at temperatures varying from 290° F. to 310° F., but when draw-plate or bakers' ovens are used these figures are materially exceeded, reaching as high as 450° or 500° F. The time allowance for roasting joints in gas ovens at the temperatures first mentioned (290°–310°) is for beef and mutton roughly computed at 15 minutes for every pound in weight, with an addition of 20 minutes. A joint of 10 lbs. weight would, therefore, be subjected to this temperature for 2 hours and 50 minutes. For veal and pork 20 minutes is allowed for each pound, with 30 minutes over; meaning that the time allowed for a 10-lb. joint of these meats would be 3 hours and 50 minutes.

When boiling fresh meats, the joints are first put into fast-boiling water for a few minutes, subsequent cooking being continued at a lower temperature. The approximate temperature of slow-boiling water is 205°–210° F., and of simmering water 180°–190° F. For cooking meat by boiling, 20–25 minutes for each pound must be allowed, with 15–20 minutes added; a joint of 10 lbs. requiring, on this basis, 3½–4½ hours' subjection to heat.

The treatment of green vegetables varies, but as a rule they are cooked in water at or about boiling point for 10 minutes, then at simmering temperature for 50 minutes. Some hospitals, however, shorten this latter time by increasing the length of the period at boiling point.

Large fish, such as cod, require steaming for about 45 minutes, or boiling for 5 and simmering for 55 minutes. The temperature in steaming chests is not constant, depending as it does entirely upon steam pressure, which varies considerably in different institutions. Although in the roasting of meat, or in the steaming or boiling of vegetables or fish, there is no certainty that complete vitamin destruction occurs, the above details as to temperature and length of exposure

at any rate suggest a disquieting probability that its value is greatly reduced. It is probable that less vitamin destruction occurs in fried than in boiled fish, if the frying is carried out rapidly and not continued long enough to destroy the succulent nature of the flesh. The unset yolks of moderately-boiled eggs probably retain their fat-soluble vitamin value after cooking; eggs, however, are not regularly provided in mental hospitals, other than for sick diets. Our attention has been drawn to the free use of suet in puddings of various sorts, but here, again, although the high vitamin value of this article is admitted, there is no guarantee that the necessary subjection to heat for a considerable period before it is consumed leaves the essential factor unaffected in value. Dripping, which may still retain some vitamin value, has nevertheless been subjected to very high temperature during the process of production from roast meat, and must therefore be considered suspect; it is still less likely to be of much value when eaten in pastry, after further cooking.

In view of these considerations it seems reasonable to divide all foods, as served on the table, into two classes—(1) unaltered material in raw state, not interfered with in any way, and (2) foods that have been subjected to processes that may be expected to minimise their vitamin value. In the former we place all raw green vegetables, milk, and butter; in the latter all the other articles of diet mentioned above that require the assistance of the cook before they can be eaten. Pending further research, in what would be a most useful field of enquiry, we are not prepared by any means to condemn the second of the above classes as useless from an accessory point of view, seeing that patients in mental hospitals have for the most part depended in the past upon the foods in it for sustenance and nutrition; but we are strongly of opinion that, if the vitality of the patients as a whole is to be increased, and the tendency to such diseases as tuberculosis proportionately reduced, more reliance should be placed upon the use of raw green vegetables (lettuce, watercress and the like), milk, and butter, for the certain supply of fat-soluble A.—all other possible (cooked) sources of this vitamin being considered in the light of accessory or supplementary supplies, for what they may be worth after preparation for table. Our study of existing mental hospital dietaries has satisfied us that raw green vegetables are supplied regularly and frequently only in a very few institutions, even during the months when they are plentiful; that whole milk, with equally few exceptions, is given to the bulk of patients in very small daily quantities and almost entirely in hot beverages, and that (save in one institution) butter is not provided at all.

We should like to have added cheese to the first of the above classes, seeing that it is provided in varying amounts in a fair number of mental hospitals; but this article as supplied is almost invariably the ordinary commercial product made from skimmed or separated milk, most commonly the latter, which (from a fat-soluble A. point of view) has little or no value. Cheese made from whole milk, which is rich in this vitamin, is not obtainable in sufficient quantity, or is only to be had at too high a cost for use. We refer here to the purchased, not

the home-made product. At least one mental hospital (Three Counties) manufactures without undue difficulty, in sufficient quantity for institution use, a cheddar cheese of high nutritive and vitamin quality at a cost which, in view of the importance of this commodity as an article of diet, is reasonable and justifiable.

We have been materially influenced in our decision to place emphasis on the need for securing a sufficiency of fat-soluble A. by our knowledge that long before the existence of accessory food factors was recognised, or even suggested, the administration of all the foods richest in the fat soluble substance—milk, cream, butter, eggs and cod-liver oil—was considered essential for the prevention and treatment of tuberculosis and other diseases that are predisposed to by low physical vitality.

Reverting to the table on page 14 (showing the association between the incidence of tuberculosis in its relation to high and low calorie dietaries) we are of opinion that, although the actual chemical value of the diets upon which the arithmetical estimations are based may be partly responsible for the varying incidence of tuberculosis, it is possible that vitamin value may be an equal if not a more cogent factor. It is reasonable to assume that an increase in the amount of food will generally mean a proportionate increase in the vitamin content.

With regard to water-soluble B., the evidence in favour of deficiency is less clear. Beri-beri is unknown as a disease originating in mental hospitals, but a condition of unexplained œdema, which may bear some relation to the “wet” variety of the disease, is not uncommonly met with. This condition is similar to the “war œdema” which was prevalent during the food shortage and inferiority in quality that characterised the years 1916–1918, and which was definitely traceable to food deficiency, with a strong suspicion of blame upon shortage of water-soluble B.

Dried peas and beans are used fairly commonly in mental hospital dietaries, and oatmeal is provided in many of them. These supplies afford a certain measure of security; but, unfortunately, bread, which is the staple cereal (so far as water-soluble B. is concerned), and which in many institutions is the only food of this class provided daily for two meals out of three, is made of pure wheaten flour completely denuded of embryo and coverings, and, therefore, practically valueless so far as this factor is concerned. Rice also, another staple article, is so “polished” as to be robbed of its vitamin value. Although not in a position to justify our suspicion that deficiency in this factor occurs in mental hospitals, we think that the safest course is to assume the probability. An efficient remedy would seem to be the regular use of whole-meal or germ* bread. The Committee on Accessory Food Factors expressed the opinion that as the temperature of the interior of a loaf of bread does not rise above 100° C. during baking, no serious diminution in value of this vitamin need be apprehended as the result of the application of heat.

* At Leicester City Mental Hospital a good germ bread is made by mixing 25 per cent. of wheat embryo with 75 per cent. flour. This bread is much appreciated by patients.

EXISTING METHODS FOR THE SUPPLY, PREPARATION, COOKING, AND DISTRIBUTION OF FOOD.

The supply of food.

Foodstuffs for mental hospitals are usually purchased by contract, entered into between visiting committees and dealers in proximity to or within easy reach of institutions. The common practice is to insert advertisements in local papers, the daily general press, or contract journals, or all three, inviting tenders for the supply of provisions for periods varying from three to six months. During the war, and in some instances subsequently thereto, owing to price fluctuations, arrangements have been made for shorter periods or for the immediate supply of definite quantities of the most unstable commodities.

Where practicable, samples of the foods required are exhibited by the hospital authorities for the guidance of contractors, or, alternatively, a detailed specification or description of each article is provided. The difficulty, however, experienced in drawing up an exact specification, in order to secure a uniform grade of article, is found to be great, especially so in the case of perishable materials and seasonable goods; in consequence, a considerable measure of reliance has to be placed upon the goodwill and integrity of contractors. The character for fair dealing or otherwise of the person tendering must therefore be an important factor in the acceptance or rejection of tenders, notwithstanding price. Where a sample is not shown, or no description given, the contract invariably contains a condition that the goods supplied will be subject to the approval of a duly authorised officer, usually the steward. Sealed tenders are sent in some cases direct to the clerk to the visiting committee, in others to the medical superintendent, and in a third section to the clerk and steward of the institution concerned. As a general rule, tenders are opened at a meeting of the visiting committee, or a sub-committee of that body, it being common practice for them to accept the lowest tender, unless the lowest emanates from a contractor *who has definitely failed* on previous occasions to give satisfaction in supplies.

We have had ample evidence to the effect that the majority of visiting committees undertake this part of their duty with great care and discretion, and that, with due regard to economy, the main object they keep in view is the provision of an adequate supply of good quality food. The only fear we have is that, in a few cases, committees adhere too strictly to the principle of the acceptance of the lowest tender, paying insufficient attention to the character of the dealer and thereby crowding out better contractors who will not reduce their prices at the expense of quality.

The steward of a mental hospital is the person generally responsible for the requisitioning of supplies, and for seeing, in accordance with the conditions of the tender, that deliveries are in strict conformity with accepted contract specifications. Failure on the part of a contractor to supply satisfactorily is reported by the steward to the medical

superintendent in some instances, and in others direct to the visiting committee. Our evidence did not make it quite clear that committees accepting tenders are always fully cognisant of the way in which all contracts are fulfilled, and we think that the special report book already in use in many institutions should be adopted in all, and be available for the information of the visiting committee at each meeting, particularly when tenders are under consideration.

In about eight mental hospitals, situated within easy reach of large markets, the steward has authority to purchase meat and all classes of perishable articles personally in the open market. By this means it is claimed that full advantage can be taken of favourable prices and of occasions when a sudden glut of particular articles presents opportunity for economical purchase. We felt compelled to accept the statement that this practice affords greater opportunity for providing a varied diet, seeing that a man on the spot is able on occasion to purchase—when unexpectedly available in bulk and correspondingly cheap—large quantities of such articles as rabbits, chickens, ox-tails, tongues, hearts, liver, etc., items that no contractor would dare to undertake to deliver in large quantity at any specified time, except at prohibitive rates.

We received strong evidence as to the economic value of this kind of open-market buying from persons by whom it is being regularly carried out. One steward, who has bought in this manner for his hospital for 11 years, and another who has had six years' experience of the practice, spoke in no uncertain terms as to its value from a diet point of view, whilst admitting possible disadvantages unless capable men of rectitude, with a high sense of responsibility, are chosen for the work. We also had definite evidence from the medical superintendents, under whom these stewards and others similarly employed are working, as to the value of their services in this particular practice.

Although we are aware that the open-market purchase of meat and perishable articles is impossible in those mental hospitals that are situated in districts remote from busy centres, we think that, when the practice can be carried out, the advantages greatly outweigh the disadvantages. Opportunities for fraud, inseparable from all posts of financial responsibility, can be guarded against in many ways; but more particularly by the selection and appointment of capable and trustworthy persons, who should be well remunerated for their work. It seems to us that, whenever feasible, a combined system, including the purchase by contract of non-perishable foods and by the open market buying of perishable articles, is an ideal to be aimed at. Adequate cold storage, either on hospital premises or easily available elsewhere, would be a necessary adjunct to this procedure, otherwise full advantage could not be taken of opportunities for the favourable purchase in bulk of perishable foods that are not likely to be required for immediate use.

Although some authorities stipulate for the supply of joints, the majority of contracts for the regular supply of meat deal with hind or fore quarters of beef or carcasses of mutton or lamb, and the receiving officer has to accept, and make the best of, his supply on this basis. In this detail visiting committees are influenced doubtless by the

relative cheapness of meat in the carcase, in contradistinction to meat in joints ; but having to deal with carcasses only ties the hands of those in control of mental hospital kitchens unduly, by rendering it difficult to get away from the routine provision of fixed meals. Monotony in dinners, to which attention has been drawn, is largely due to this. It is obvious, when purchases are made by the carcase, with its limited number of prime joints, that the residue to be used up is disproportionately large, calling for more ingenuity than is now exercised to secure therefrom varied and palatable dishes. Moreover, the demands of a large boarded staff have to be met, with the result that there is a tendency to appropriate the prime joints for their benefit and leave the less costly parts of meat for the use of patients. Unless care be taken, it is to be feared that the purchase of meat in huge quantities by central county stores, for distribution to several large institutions, will tend to increase this difficulty.

In this connection we think that the method of obtaining meat supplies adopted by one of the largest authorities in the country (the Metropolitan Asylums Board) has many features that commend it for general use. In Appendix D (page 97), Schedule I, is a tender form used by this authority for the supply of meat, which provides for the delivery of carcasses, or joints, or any portion of the carcase as may be desired to meet the requirements of any meal to be provided. In this way the supply of meat is ordered to fit the meal to be provided, instead of the reverse. It is submitted that this method, which does not prove more costly, will certainly aid catering authorities in providing variety.

Beef and mutton are generally of the imported type, and, as regards the former, the chilled variety is more often purchased than the frozen. Foreign mutton must of necessity be frozen on account of the distance it has to travel ; chilled mutton is not available in marketable quantity at present. Only a few institutions purchase home-killed, as distinct from killing home-reared stock. In one or two instances cattle are regularly purchased in the open market and slaughtered at the hospital. In many institutions where milk is supplied from home farms it is customary to kill off for consumption all "dry" and old cows past profitable bearing. Pigs for the supply of pork are generally home-reared and killed.

The purchase of fish is usually made by contract from the large fish docks ; but several authorities have found it advantageous, and more satisfactory in every way, to purchase through a contractor whose place of business is close to the hospital. In some instances, however, the value of this practice has been reduced by allowing him the option of supplying direct from the fish docks any one or more of several kinds of cheap fish for consumption by patients, with the result that the same kind of fish is frequently supplied, resulting in waste from lack of variety. Here, again, we submit a specimen form of tender (Appendix D, page 98, Schedule II) which will enable variety and good quality fish to be provided with due regard to economy.

Milk is supplied to nearly all mental hospitals from home farms, an attempt being made to maintain a sufficiently large herd of cows to

ensure a regular and adequate supply at all times. In view of the facts that farm acreage is in some cases too restricted, that seasonal conditions always cause material fluctuations in supply, and that the variable incidence of sickness amongst patients gives rise to fluctuations in demand, some hospitals find it better to limit themselves to the provision from home sources of from two-thirds to three-quarters of the average demand, leaving the variable surplus, large or small, according to circumstances, to be supplied by purchase. Provided that the supply is adequate, that the quality is uniformly good (as shown by analysis for fat content, and bacteriological examination), and that the cost is reasonable, we think that the actual method of supply is immaterial and must continue to be controlled by the conditions existing at each mental hospital.

Our evidence has shown us, however, that in too many cases there is more or less persistent deficiency in supply at certain times of the year, and that the supply is very limited in some institutions at all times, the quantities per patient being too small to be of much nutritive or vitamin value. In view of the value of milk as an article of diet, we are of opinion that, whenever any deficiency in the quantity is likely to occur, arrangements should always be made to meet it by a supplementary supply from outside sources.

It is probable that a restricted supply of milk from hospital farms, and reluctance to supplement the hospital supply from outside sources, are jointly responsible for the infrequent issue of milk puddings to patients who are physically well. These articles of diet are never issued, except to the sick, in approximately 50 per cent. of mental hospitals, and are only given in about 16·5 per cent. of all dinners provided during a year in these institutions.

We are very strongly of opinion that all milk issued for the use of patients, either with porridge, in tea, coffee or cocoa, or in milk puddings, should be whole—*i.e.*, not deprived of any of its fat content.

One important controlling authority (the Metropolitan Asylums Board) responsible for the purchase of probably the largest quantity of milk for institution use, makes a regular practice of testing all supplies on delivery for fat content and the presence of added water. The apparatus employed, which we have seen in use, is exceedingly simple and capable of being worked by any intelligent person. We attach so much importance to the supply of good quality milk that we have no hesitation in suggesting that all authorities should adopt this method of securing it, whether derived from hospital farm or from other sources. Tests on these lines of milk from recently-purchased animals would afford useful information as to their productive value, and any serious variation in the quality of the total yield from a herd would naturally lead to closer attention being paid to the product of individual cows. We think that all milk delivered to an institution should be tested, particularly with reference to the percentage of butter fat, and that the record should be submitted to the visiting committee at each of their meetings.

Eggs, either in their natural form or as a constituent of made dishes, are only supplied very rarely in mental hospitals, at any rate

for other than sick patients. This, in view of their nutritive and vitamin value, we consider regrettable and capable of remedy. Recent successful efforts in the establishment of large poultry farms at some mental hospitals have proved the possibility of economic home production, and the value of the work as a congenial occupation for patients. We commend to visiting committees the view that a poultry farm should be considered a necessary adjunct to all mental hospitals.

Margarine is usually purchased by contract, some institutions specifying for the supply of particular brands, whilst others leave the question of make open, and accept the lowest quotation. The price of margarine varies, according to market rates, from 45s. to 50s. per cwt. for ordinary brands, and for oleo-margarine or margarines of higher qualities up to 84s. or 94s. With very few exceptions the price paid for margarine in mental hospitals is that for the lowest quality—from 45s. to 50s. per cwt.

Very little is known as to the composition of the low-priced article, or concerning the materials from which it is made; it is probable, indeed, that these vary considerably according to season, and according to the availability or otherwise of various fat-yielding vegetable substances. We understand that the high-priced margarines contain a varying percentage of animal fat, with an indefinite quantity (under 10 per cent.) of butter fat, and that these facts in a large measure determine their enhanced value.

Without giving any indication as to our object we submitted two (specially purchased) samples of margarine of well-known makes to a reliable analyst for examination and report. These were marked respectively A and B, the former being one of the lower-priced brands referred to above, and the other one of the makes of highest value. The result was as follows:—

				Sample A. (Low-priced.) Per cent.	Sample B. (High-priced.) Per cent. |
Water	..	..	..	12.20	13.70
Sodium Chloride	..	..	..	1.53	1.95
Other Ash	..	..	..	0.23	0.15
Undetermined	..	..	..	0.22	0.75
Protein	..	..	..	1.07	1.20
Carbo-hydrate	..	..	..	Trace	0.45
Fat	..	..	..	84.75	83.50

NOTES.

Sample A.—Energy value, 3,594 calories per pound. “This sample does not appear to contain any palm-oil, cocoa-nut oil, or butter fat.”

Sample B.—Energy value, 3,533 calories per pound. “This sample appears to contain palm-oil, cocoa-nut oil and some butter fat.”

Although we are satisfied that it would be impossible to obtain a more careful analysis from any person more reliable than the one who supplied us with that just detailed, we fully realise that other samples of the same brands might yield different results, on the ground

that "margarine" has no definite constitution. The term covers all substances, whether compounds or otherwise prepared in imitation of butter, and whether mixed with butter or not. At the same time, the samples referred to were carefully selected as representative of their respective classes, and we think may be broadly considered on that basis.

Very little difference was evident in the palatability and appearance of the two samples. From a nutritive standpoint the energy value, as estimated in calories, is actually greater in the cheap specimen than it is in the one of higher cost, owing to the predominance of fat content in the former. The more expensive sample contains a slightly higher percentage of protein and carbo-hydrate; but in insufficient degree to compensate for its lower fat content. It seems evident, therefore, from the standpoint of energy, that no advantage is to be gained from the substitution of the higher for the lower-priced article.

The main difference between the two samples, as shown by the analysis, is the presence in the more expensive one of some of the higher-class vegetable oils and "some" butter fat. From a vitamin point of view the presence of palm oil and cocoa-nut oil affords little or no advantage (both being in the vegetable class), so that the only point in favour of the higher-priced article is the fact that it contains "some" butter fat, the amount of which could not be estimated exactly. Having regard to the difficulty that would always be encountered in securing, with any amount of certainty, the presence of butter (or other vitamin-rich fats) in fixed proportion, and in view of the possibility that the accessory value of these fats may be minimised by heat, aeration, or other chemical processes to which they may be subjected during manufacture, we think, from a vitamin point of view, that the substitution of the higher for the lower-priced article would be of doubtful value. Should the administration of butter be considered desirable as part of the diet of patients in mental hospitals, and questions of cost prohibit its exclusive use, the most reliable result would be obtained by the separate purchase of butter and ordinary low-priced margarine; subsequent blending in the proportions desired being carried out in the institution. This method would be more likely to secure vitamin value than the purchase of high-priced margarine. As a possible alternative butter might be given, in pure form, at 7 of the 28 breakfasts and teas during each fortnight. We realise, however, that there are objections to the adoption of this suggestion.

Potatoes, other vegetables and fruit.—Nearly all institutions endeavour to supply the demand for potatoes from their own farms, an effort in which they are for the most part successful. In some cases, however, owing to the need for much grass land, and the restricted area of arable land, resort has to be had to supplementary purchase in order that full requirements may be met. But, in regard both to quantity and quality of supply, our evidence provides us with no ground for special comment; we find that potatoes are given their due prominence as valuable articles of diet, and, as we have already shown, are provided almost daily throughout each year in all mental hospitals.

With reference to green and other fresh vegetables, the same efforts at self-supply are not so universally successful. Some institutions manage the provision of these important articles of diet with regularity and variety, others with regularity without adequate variety, and a third section with insufficient regularity. In many hospitals we find a satisfactory sequence of cabbage or other green food, swedes, parsnips, carrots, turnips, onions, etc. ; in others cabbage is considered the staple second vegetable, with too little variation, and in others, again, vegetables of any kind (other than potatoes) appear from once only to two or three times weekly. Included in the last class are those institutions that indicate on their diet scales the provision of vegetables "when available from the farm."

Inequalities in these matters seem to be due mainly to the different methods of control adopted at different institutions and to the presence or absence of adequate co-ordination between the responsible heads of farm and kitchen departments. Matters bearing special relation to kitchen control will be dealt with fully at a later stage of this Report ; in the meantime, we desire merely to express our opinion that when a diet scale has been fixed by the medical superintendent to cover a definite period, or by the visiting committee on his advice, such scale should include a variety of vegetables as well as meats, and the farm should be expected to supply those vegetables—on the requisition of any person whose duty it is to see that the diet scale is adhered to. There will continue to be some chaos and dissatisfaction so long as farms are permitted to supply the kitchen with vegetables not in accordance with scale, or with no fresh vegetables when such are scheduled. The fact that some crops make the farm accounts appear more healthy than others should not be permitted to affect the supply of those materials that are actually required. Farm produce should invariably be subordinated to dietary scale requirements, and these should be fully considered when the suggested crop allocations for a year are under consideration. Should the farm at any time be unable to provide fresh vegetables as required, a responsible officer should be authorised to obtain them by purchase.

We are glad to note a tendency during recent years towards the regular supply to patients of salads during the seasons when these are available, and desire to emphasise the importance of growing an abundant supply of such articles as lettuce, beetroot, tomatoes, watercress (when possible) and mustard and cress, or the occasional purchase of such of these as cannot be grown on the premises, always bearing in mind that the vitamin value of the green foods and tomatoes renders them especially desirable.

We think fresh fruit should be supplied as often as possible when in season, and that, to provide for this, all mental hospitals should increase the area of their orchards as many have already done. Our examination of the details submitted to us seems to indicate that in many institutions fresh fruit is very rarely given—only, in fact, on a few isolated occasions during each year when the supply greatly exceeds the demand for ordinary cooking purposes. In this connection we are glad to note that several of the large mental hospitals have made

arrangements for a regular supply of apples and oranges during winter months.

The preparation of food.

With regard to the preparation and (as will be seen later) the cooking of food, the chief defect, in the majority of mental hospital kitchens, is the absence of sufficient equipment to render possible the provision of a varied dietary, and, in some cases, even the supply in accordance with existing scales of well-cooked dishes of light and digestible character.

All hospitals are provided with steam power, and, in 63 cases electricity is available also for this purpose. Notwithstanding this, in 20 institutions only has any motor-driven machinery been installed for the preparation of food, despite the economic and other advantages that follow its installation. The machine of all others that has justified its value is one of the "Hobart" type, which, by the aid of many attachments, cuts boned meat into a uniform size for pies and stews; shreds suet; minces meat and makes sausages and fish and meat paste. It also grinds coffee and cereals—including split peas into pea meal, barley into barley flour, lentils into lentil flour, and rice into ground rice. The advantage of this home grinding of cereals is obvious—there is no question of adulteration, and the expense of repeated analysis is avoided when this work is done on the premises. Moreover, by grinding peas and lentils, especially peas, it is possible to make a much better stew or soup with a greatly-reduced quantity of the finely and evenly-divided material. Our evidence points to an average reduction in the amount of meal necessary of about 33 per cent., with the production of a more palatable and more easily-digested article. Suet for puddings can be prepared by this machine at the rate of 90 lbs. in 12 minutes, without any waste whatever, a result which cannot be obtained by hand labour. It has also been demonstrated to us that puddings made with suet so prepared are much lighter, more palatable, and require much less of this ingredient—the gain amounting to at least 25 per cent., as compared with hand methods of preparation.

Attached to the machine are two bowls of different sizes, with revolving blades, in which the material for puddings, pastry and cakes are mixed. Puddings and materials for cakes can be prepared for cooking by this machine at the rate of 5 cwt. each hour—one man operating—resulting in better food, greater appreciation and, consequently, less waste. It is found possible to attain this result, as compared with hand labour, with a reduced quantity of flour amounting to about 25 per cent.

We have seen and tasted meat and fish pastes, the quality and palatability of which leave nothing to be desired, made quickly and at small cost with a further attachment. The pastes were so finely made that they could be spread on bread as easily as butter.

These are some of the directions in which machines of this type are proving of great value in the preparation of food ; there are many others too numerous to mention. We think that every kitchen in a mental hospital should be provided with one as part of its ordinary equipment, for the following reasons :—(1) To prevent the unnecessary handling of food, thereby reducing the danger of infection ; (2) to ensure more rapid preparation generally, so that, especially in the case of meat, cutting up and cooking may take place the same day ; (3) to permit the addition to the dietary of articles of food that are now impossible, and so secure greater variety ; (4) to improve the palatability, digestibility, and appearance, of puddings and made dishes, and (5) to promote economy in the use of materials and reduce waste.

Machines for the washing and paring of root vegetables and potatoes are in use in 55 hospitals, some being motor, others hand-driven. At the remaining 40 institutions vegetables are washed and peeled by hand, a much more wasteful method than by machine. It is probable that, in these cases, the provision of employment for patients has been considered of more importance than the saving of materials ; at any rate, this view of the subject has been presented to us. It should be realised, however, that the washing and peeling of potatoes and root vegetables, often by the same patient day after day throughout a year, is an extremely monotonous occupation, and in the winter a particularly cold and unpleasant one. If the introduction of machinery for this purpose displaces patient labour, we think, by the development of other industries, it should not be difficult in any large institution to provide employment of a much more congenial and interesting character. Apart from this, the time occupied in the preparation process is an important factor. In large hospitals, where hand labour is relied upon, and in many even of the smaller ones, vegetables have to be prepared the day before they are required. This entails subsequent soakage in water for some hours, with softening of tissue as result and discolouration on cooking. Defect of any kind in food, as served, leads to waste.

The most efficient machines are those electrically driven, providing, according to capacity, for the paring and washing of from 20 to 60 lbs. of material in one minute. With proper implements and careful organisation the subsequent overlooking of potatoes for the removal of "eyes" and damaged parts should not take long. If, in a large hospital, electrically-driven machines are installed of 60 lbs. per minute capacity, it becomes an easy matter to calculate the approximate time required to provide vegetables for any given population, so as to enable cooking to follow immediately after preparation. The unloading of the machine at the proper time to prevent waste, by unnecessarily prolonged friction, can be secured by the provision of one-minute "pulse" glasses.

Ham boilers are available at only a few institutions, notwithstanding the fact that, where they have been regularly employed in food preparation, they have proved of great advantage. By their use it is possible to cook, under pressure, with practically no loss, the less expensive parts of a side of bacon, such as fore ends, etc., and convert

them into a most palatable article of diet. These portions when so treated, after cooking, cooling, and removing from boilers, have the appearance of a good-sized ham, ready to be placed upon the slicing machine for carving.

The cooking of food.

Cooking in mental hospitals is mainly done by steam, supplied from the central boiler-house, with the aid of gas or bakers' ovens for roasting. The majority of kitchens have no other means of cooking.

The steam plant usually provided consists of boiling pans for making beverages, and pans of similar construction for preparing porridge and boiling meats, vegetables, soups and stews. In addition, steam cabinets, consisting of several compartments according to requirements, are provided for cooking fish, potatoes, root vegetables, meat, and puddings of all sorts. Steam cooking apparatus has been greatly improved in design of recent years, and there is little room for adverse criticism concerning the pattern of those now fixed. In some of the older hospitals, however, there are still some of these appliances in use of square construction, rendering cleanliness difficult to secure, and still a few that are fixed close enough to floor or wall to favour the existence of beetles and make it difficult to get rid of them.

The value of steam for cooking on a large scale has resulted in its general adoption; it is always available when required, is easily managed and clean in working. But, unless care be exercised, the ease with which it can be employed is likely to prove disadvantageous by increasing, as it may easily do, a tendency towards monotony in cooking. The following dietary scale for a week's dinners, given at one hospital practically throughout the year, provides an example of this :—

Monday—

Beef, steamed and minced with vegetables.
 Carrots or (cabbages, turnips, green peas or haricot beans,
 whichever is available).
 Rice—made into milk pudding.

Tuesday—

Beef, minced and steamed	}	Potato pie.
Potatoes		
Flour		
Dripping		

Wednesday—

Beef (in joints), roasted.		
Beans or (cabbage or turnips, whichever is available).		
Flour	}	Made into suet pudding. (Rhubarb substituted, when in season, for currants.)
Currants		
Suet		

Thursday—

Beef, minced and steamed	} Hot-pot.
Potatoes (baked on meat)	

Friday—

Beef, minced, steamed.
Potatoes, steamed.

Saturday—

Bones	} Made into
Beans, split peas, lentils and flour		soup.
Rice—made into milk pudding.	
Cheese.	
Bread.	

Sunday—

Beef, steamed (in joints).
Peas.
Flour made into suet pudding and served with jam.
Suet.

In general, roast meats, baked meat pies, and baked puddings are cooked in large gas ovens ; but 28 hospitals possess, in substitution for or in addition thereto, draw-plate or ordinary bakers' ovens for these purposes, either in the kitchen itself or in a bakehouse built in close proximity. Where, in particular, draw-plate ovens have been substituted for those heated by gas it has been found possible to cook food better and more economically, owing to more complete control over temperature and the greater facility afforded for the separate treatment of joints of varying sizes. It is possible, with the assistance of the pyrometer supplied with these ovens, for an officer in charge of a kitchen, given a known temperature and a known weight of joint, to compute with precision the time needed for cooking, so as to avoid waste. This is not possible with gas-heated ovens, owing to varying pressure. We had evidence in one case, where a careful record was kept, that the saving effected in the consumption of gas repaid the cost of the installation of a new draw-plate oven in two years.

Fish-fryers are provided at only 30 institutions, a number that includes all the mental hospitals under the control of the London County Council. Fish provided for patients in any of the other 65 hospitals is usually cooked by steam, a method that produces an unappetising dish and one that is practically incapable of even distribution. Unattractively prepared food is almost invariably only partially consumed, causing deficiency in essential nutritive factors and increase of waste—considerations that are especially important when fish dinners are of weekly occurrence. Even when fish-fryers are provided it may prove impossible to fry fish for all patients in large hospitals on one day ; but, with the exercise of ingenuity, it should be possible to initiate

a system of rotation, so that, within a given period, each patient could be provided with a fried fish meal. This course is now followed in the majority of those institutions possessing the necessary appliances. If, in addition, fried potatoes were also supplied, which could easily be done with the aid of a vegetable slicing attachment to the Hobart machine, a further welcome change in the dietary would be available without extra cost on material. Fish-fryers could also be used with advantage for other purposes that tend to variety—the cooking of sausages, for instance, and liver.

The distribution of food.

During our consideration of questions relating to the distribution of food we have kept in mind the following principles :—

- (1) That all patients should receive a supply of food suited to their appetites and physical requirements.
- (2) That food should be so evenly distributed that persons of normal appetites may be provided with portions of equal quantity and quality.
- (3) That all food should be neatly carved, of appetising appearance and cleanly served ; and
- (4) That food intended to be hot should really be so at the time when patients are ready to eat it.

Although some doubt was expressed as to whether a consideration of the respective merits of central and ward dining came within our terms of reference, we found it impossible to ignore the subject entirely. As our enquiry developed the question proved to have too material a bearing upon the principles enumerated above to justify disregard ; added to which the matter was referred to by all who provided us with evidence on the subject of institution dietaries, being considered of importance by many of them. The opinions expressed by some persons were strongly in support of central dining, whilst others, with as wide experience, equally favoured ward feeding. A third section suggested that both methods possessed advantages, without expressing any decided preference for either. As a result, we have determined to state briefly the divergent views presented to us, and content ourselves with a simple expression of opinion on the evidence we have received. We regard the question, for the most part, as an administrative one, the only aspect of it that seems to us vital to our present enquiry being as to whether or not food can be equally well supplied to patients under either condition of service.

In the majority of hospitals all patients feed in their own wards ; in about 24 institutions the sick and debilitated, and those mentally unfit for association, are fed in wards, all other patients being collected in a central hall for meals ; and in 17 or 18 other hospitals, specified sections, for the most part workers and quiet chronic cases, approximately a third of the population in each, are given their food centrally, and the rest in wards. Therefore, whilst it is possible for all patients to dine in their respective wards, it is apparently impossible for all patients to dine centrally—the patients in some wards have to be

totally excluded, whilst some of those in other wards are fed in the dining hall, and some in the wards.

Those in favour of central dining base their advocacy on :—

- (a) The advantage of emptying wards at specified times during each day, so that a free change of air may be permitted—most useful on wet days when airing courts are not available ;
- (b) The better service of hot food with no loss of time, owing to the contiguity of dining hall and kitchen ;
- (c) The greater facility for the general supervision of patients ;
- (d) The necessity for the maintenance of less equipment—fewer wagons, baskets, cans, tins, etc., needed ;
- (e) The less necessary presence of knives and other implements in wards ;
- (f) The reduced probability of leakage between kitchen and hall than between kitchen and wards ;
- (g) The difficulties met with in conveying food up many stairs to second-floor wards ; and
- (h) The probability that waste of food is less easily controlled, owing to the greater difficulty experienced in the collection, and return to the kitchen, of unused food.

Those persons who favour ward dining maintain that :—

- (a) Ward feeding is more homelike and that patients as a rule prefer it ;
- (b) Moving patients from wards to dining hall two or three times a day is the cause of disturbances that would not occur otherwise ;
- (c) When patients are carefully selected in wards their frequent congregation in a dining hall minimises the value of classification ;
- (d) When 400 or 500 persons are collected together considerable difficulty is experienced in serving all with hot food. The last few tables supplied generally suffer.
- (e) Patients feeding in wards are always supervised by their own nurses, who know them well and are familiar with the appetite and peculiarities of each ;
- (f) Patients difficult with food can be given more individual attention ;
- (g) Although the majority of patients can be moved to a dining hall, some wards have to be excluded altogether, whilst some patients in most wards have to be retained on account of temporary or permanent unfitness—so that two systems are working ;
- (h) The use of the central hall for entertainments is interfered with, the need for the removal of dining furniture acting as a deterrent.

After reviewing the evidence, we came to the conclusion that the advocates on both sides had good arguments in support of their claims, but that on neither side were any so compelling as to justify us in

making a definite recommendation in favour of one system as against the other, especially having regard to the varied design of buildings in different parts of the country. Some institutions are undoubtedly better adapted architecturally to ward feeding than to the use of a central hall, and the reverse holds good in others. Moreover, so far as the properly-conducted supply of hot food is concerned, we satisfied ourselves that, with adequate precautions and attention to detail, the service can be (and in some hospitals is) as good under one system as under the other. Failure under either system, where evident, is due to inefficient organisation, or, more often, to the inadequate provision of suitable facilities for the transfer of hot food from kitchen to table. We therefore think that the choice of methods must continue to be determined by local conditions, although, on general grounds, we cannot avoid expressing our predilection for ward service whenever this is feasible.

Bread is supplied either as whole loaves to be sliced in wards, or already cut into slices in bakehouse or stores. With few exceptions hand cutters are used everywhere; but some hospitals are provided with motor-driven slicing machines. These latter, so constructed as to necessitate the least possible handling of bread, are clean in use and rapid enough in action to reduce to a minimum the time that must elapse between slicing and eating. The introduction of these machines makes central slicing practicable, ensures the presentation of a more even supply of nicely-cut bread, decreases the risk of contact infection by materially reducing the number of persons actively employed in handling, and lessens the number of cutting implements that have to be kept in wards, more or less within reach of patients. The evidence we have received seems to indicate that if bread is machine-cut and replaced into loaf form, under pressure enough to exclude air, there is so little subsequent dryness and deterioration that the quantity required for morning breakfast may be prepared overnight without detriment. From what we have seen, however, we think that the practice of going further than this in preparation for the morning breakfast—spreading margarine or jam, for instance—should not be permitted. Some mental hospitals, instead of spreading margarine on bread, have adopted the practice of dividing it into “pats” by the aid of a specially designed stamp. We advocate this procedure as being cleaner than the old method, more likely to secure to each individual his full ration, more homely, and therefore more attractive to patients, and more conducive to satisfaction.

Owing to their simplicity, little difficulty is experienced in the distribution of breakfast and tea meals, nor do we anticipate more in the future, even should a diet of greater variety be provided. If the cooking of hot food is considered impracticable for either meal, it will be possible to supply supplementary dishes that can be cooked and prepared for issue on the day previous to the one on which they are to be consumed.

With regard to the distribution of the dinner meal, the chief fault is the inadequacy in some hospitals of the measures taken to secure the delivery to patients of freshly-cooked food whilst still hot. The

difference between these institutions, and the majority of others where conditions in this respect are more satisfactory, is marked; being due in nearly all cases to lack of proper facilities or to organisation that is capable of improvement. Conditions that contribute towards undesirable loss of heat are to be found in central kitchens, in dining halls, in the means adopted for the transit of food from kitchen to wards, and in the wards themselves.

In the central kitchen the faults are mainly two, one due to an undesirable practice and the other to inadequate equipment. It is usual for dietary scales to prescribe the quantities of *cooked* food to be supplied to each patient; accordingly, it has become the practice of many institutions to weigh in bulk all food issued to wards or dining halls *after* cooking. This is done in order to prevent friction between nursing and kitchen staffs, and to avoid undue claims being made by the former for more food, on the ground of insufficiency in supply, due to loss in cooking. The process of weighing occupies much time, to the detriment of the food, notwithstanding the provision in some hospitals of hot plates and other contrivances to minimise loss of heat. We think that this procedure should be rendered unnecessary by the supply to all kitchens of bakers' ovens, or, better still, draw-plate ovens, fitted with pyrometers, in order that the two factors that control waste—temperature and time occupied in cooking—may be known, and the consequent loss in weight calculated with sufficient precision for all practical purposes. If this were done, there would appear to be nothing to prevent meat being weighed out into each ward tin *before* cooking, allowance being made for estimated waste. The tins, in all cases where ward carving is considered necessary, could then be despatched to wards direct from the oven in a transport trolley adapted to their reception.

The second fault, in some central kitchens, is the length of time that is sometimes allowed to lapse between the removal of food from the cooking apparatus and its collection by nursing staff and patients, during which it is subjected to cooling. This is contributed to in many kitchens by the absence of hot cupboards in which ward tins can be placed until required; to imperfect organisation due to an attempt to supply food at one fixed time in all wards. We think that no kitchen can be considered properly equipped for its purpose without the provision of steam heated hot cupboards of adequate capacity to meet all needs; that one person in authority should supervise and be responsible for the transference of food from kitchen to wards, and that, in order to facilitate delivery from the kitchen and avoid confusion, wards should be grouped (as is already done in some hospitals) and the dinner hour made a few minutes later in some groups than in others.

Many of the criticisms relating to the supply of meat whilst hot apply equally to puddings, especially those of the suet variety. We think, however, so far as all puddings that consist of bread and flour are concerned, that the general adoption of metal pudding containers, such as we had the advantage of seeing in use at one mental hospital, should provide an efficient remedy. The requisite quantity of uncooked

material is placed in these containers, which are subsequently closed, subjected to steam cooking or boiling, and not reopened until they reach the wards or until patients in a central hall are ready to receive their second course.

In institutions where food is served to a large number of patients in a central dining hall the contiguity of the kitchen renders the supply of hot food less difficult, especially when steam-heated carving tables, provided with hot cupboards for the warming of plates, are installed. Unfortunately, in some dining halls, this equipment is not available, with the result that the advantage gained by the contiguity of the kitchen is largely nullified by the time occupied in carving on ordinary tables for so large a number, and by the distribution of food on imperfectly-warmed plates.

The conveyance of food from kitchen to wards, in such manner as to secure its arrival whilst still hot, has always presented difficulty ; the distances to be covered are often considerable, and the means available for transit not always the best that could be devised. In many small institutions, and even in some large ones so far as short journeys and the supply of small wards are concerned, food is often conveyed by hand from kitchen to wards in covered tins, which may be either plain or hot water jacketed. For longer distances wagons or trolleys have been constructed of wood, wood with metal lining, or of metal only, jacketed or plain—trust being placed in the latter case in a good cover for the retention of heat. During our visits to institutions we have seen some good designs ; but we think there is still room for the exercise of ingenuity in the production of something better. Moreover, we are not aware that anything so far has been devised for upstairs carriage, and first floor wards are common in mental hospitals. So far as we have been able to gain information on the point, hot water jacketed containers appear to represent the only effort made to maintain the internal temperature artificially, and the wood and metal, or plain metal, containers the only attempts to prevent loss of heat by radiation. Hot water jacketed containers have not proved efficient, or at any rate of the value anticipated ; they are troublesome to fill and empty, are heavy when full, and are very liable to damage and leakage. A perforated empty jacket becomes fouled with meat juices in time, and cannot be properly cleansed. Wooden wagons, with or without metal lining, are apt to become fouled with grease or persistent handling ; whilst those of solid metal, probably the best now in use, possess no means of artificially maintaining internal temperature, and have the disadvantage of presenting to the air of cold corridors a large radiating surface.

It was, more than anything else, the desire to obtain a solution of this particular problem that induced us to enlist Mr. Stanley J. Benham's services. We hoped that his visit to certain American and Canadian mental hospitals would provide him with alternative suggestions for improvements on our methods. After his return we received from him a report (Appendix G, page 121) describing *inter alia* two trolleys he had seen, one electrically heated, the other insulated, together with

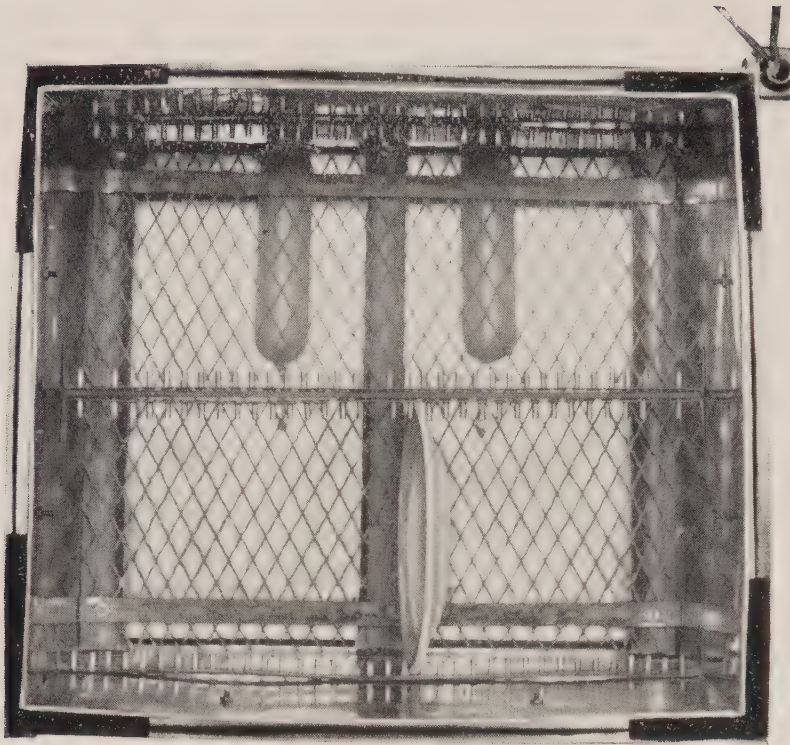
a sketch showing how the latter might be adapted to meet our requirements. The electrically heated trolley is constructed of plain metal throughout, and contains a protected heating element which can be connected by a wall plug to the institution electrical service in the kitchen, and also in the ward should this be considered desirable. By such means it is possible to warm the trolley before the food is placed therein, and for a short time after closing down, before disconnection for transit. Reconnection can then be made in the wards should any delay occur in the service of food, or when needed to keep a second course hot until required. The alternative suggestion aims at the more complete retention of heat by interposition between the cooked food and the outside air of a layer of insulating material (such as compressed cork or cork composition) that will be light in weight, and non-conducting. If the insulation is complete—top, bottom and sides—it is claimed that loss of heat is extremely slow, and that a trolley constructed on this principle should meet all requirements. There would seem to be every reason to suppose that both these principles are also capable of adaptation to containers for the hand carriage of sick diets, and smaller quantities of food.

Although American and Canadian authorities are to be found who advocate the application of both these principles to food trolleys and containers, we, in the absence of experience, can offer no opinion on their respective merits. We think, however, that both are practical propositions; the one that provides artificial heat is certainly a great advance on the hot water jacket, and the other, without doubt, promises a more complete retention of heat than the plain metal trolleys now in use. On these grounds we advocate a trial of both, leaving experience to show which of the two possesses the greater advantage.

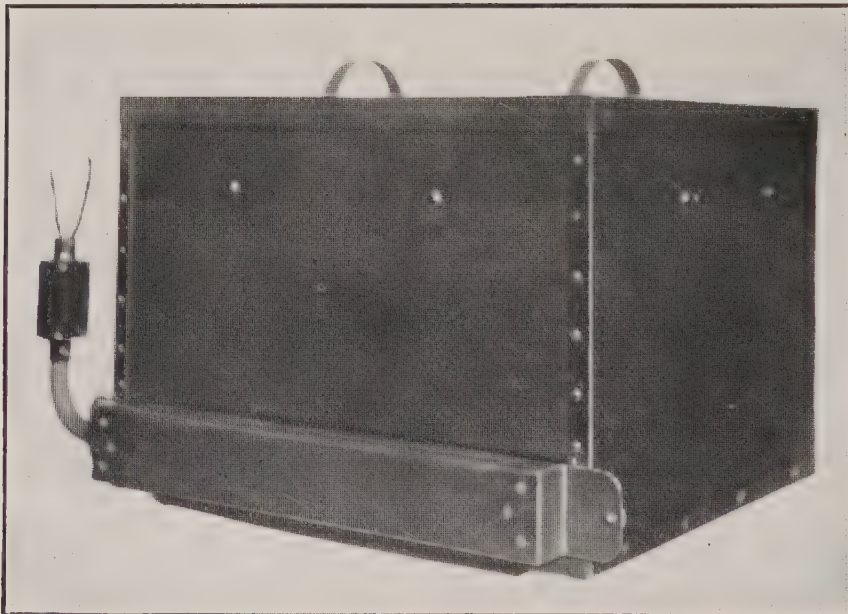
In only 14 hospitals are wards equipped with steam hot-plates or cupboards, on, or in, which food can be kept hot during distribution. When it is realised that at four different institutions upwards of 150 patients are accommodated in one ward, that, in 11, wards contain upwards of 100, and that in 48 other institutions the number exceeds 50 persons, the need for the existence of some means for keeping food hot is obvious. So long as wards of the sizes indicated are not equipped with suitable conveniences the provision of hot meals to all patients must remain a matter of great difficulty.

The supply of hot food in wards, as in dining halls, is largely dependent upon the temperature of the plates on which it is served. Although in most cases efforts are made to comply with requirements in this respect, they are not generally successful, owing to the absence in very many places of adequate equipment. Too often, mainly because of the absence of proper facilities, the warming of plates is regarded as of secondary importance; resort being had simply to piling them before a ward kitchen fire, or placing them for a few minutes in hot water—the effect being uneven or merely surface warming which is not lasting. The fact that all wards are provided with hot water, and nearly all ward kitchens with fires, would seem to render the provision of a hot cupboard a matter that should present no engineering difficulty.

WINWICK PLATE-WARMER.



PLAN.



ELEVATION

To face page 41.]

In this connection reference must be made to an ingenious electrical plate warming apparatus which we found installed in the ward kitchens at Winwick mental hospital, and which, as an alternative method of plate warming, might be seriously considered for general adoption. The apparatus is clean, simple in action, requires a minimum of attention and is very effective ; we found plates so evenly heated that they remained warm at the conclusion of a meal. The medical superintendent and the engineer are jointly responsible for the apparatus, a drawing and specification of which, through the kindness of the latter, we are able to produce as an Appendix to this Report (page 102).

It is impossible to leave the subject of the distribution of food without some reference to the matter of the carving of meat, upon which we found widely differing opinions. We had to consider whether machine slicing presents sufficient advantages to justify a recommendation for its general adoption, and whether meat is better carved centrally or in wards.

According to the evidence we received "Berkel" meat slicers have been installed in the kitchens of 21 hospitals, three others notifying us that the question of purchase "is under consideration." In one or two instances electrical power is employed to drive these machines ; but the majority are operated by hand. Two of the 21 machines (and occasionally a third) are used for the slicing of all hot and cold meats, and bacon ; five or six for the carving, more or less regularly, of cold meats and bacon ; and the use of the remainder is restricted to the slicing of bacon only.

With regard to the value of these machines for the carving and distribution of all cold meats and bacon, no difference of opinion was evident amongst those persons who have had experience in their use. It was, in fact, generally conceded that machine sliced cold meat presents a more appetising appearance than meat hurriedly carved by hand, and that machine slicing is more economical than hand slicing, in that waste in the former case is reduced to a minimum. Furthermore, the machine carving of cold meat, especially if the slicer is motor-driven, permits of the work being done rapidly in the central kitchen, thereby facilitating distribution in the wards. So far, therefore, as the slicing of cold meat is concerned we are in agreement as to the value of the "Berkel" machine, being of opinion that, even should it be used for this purpose only, its installation is both justifiable and desirable.

When it came to the question of the use of slicing machines for hot meat we found differences of opinion ; some users being strong advocates whilst others were sceptical. One or two medical superintendents stated that the unsatisfactory result of trial led to the practice being abandoned. So far, however, as we have been able to obtain information the number of institutions that have given hot meat machine slicing a fair and extended trial is very few indeed, too few to justify us in expressing a definite opinion on the point. Moreover, in the light of further experience it is possible that, where failure has resulted, other details of kitchen equipment may not have been favourable. The machine slicing in a central kitchen of hot meat, for a large institution, cannot be practised under ordinary conditions with success ; the

slicing machine must be in close conjunction with a hot-plate, and steam heated cupboards of adequate capacity must be close at hand. In two instances only, during our visits to institutions, were we able to watch the slicing of hot meat in a central kitchen ; in one we thought the result in every respect all that could be desired, in the other the work appeared to be indifferently well done, owing, we were informed, to the absence on leave of the most skilled hands.

On the practicability or otherwise of the machine slicing of hot meat, and the possibility of overcoming its disadvantages (greater opportunity for cooling and an alleged tendency to dryness), depends the question of the substitution of central slicing for the ward carving that is now almost universal. It is obvious that central hand carving for a large institution is out of the question. Should the central machine carving of hot meat prove possible, and we think an effort should be made to render it so, ward service would be greatly simplified and meat would be more evenly distributed to patients. The necessity for rapid carving in wards, sometimes by unskilled persons, does not always conduce to an even supply of meat, and occasionally affords some reason for discontent.

Machine carving also provides an economic advantage from the removal from joints, before cooking, of bones and uneatable material. These remain in the kitchen for subsequent use in soups, or to strengthen stews.

CONCLUSIONS CONCERNING EXISTING DIETARIES.

As the result of our study of the dietary scales with which we were supplied, and of the dietary conditions existing in mental hospitals generally, we arrived at the following conclusions :—

(1) That there is an undesirable inequality in the construction of dietary scales throughout mental hospitals, some being well balanced and thoughtfully designed, whilst others impressed us as lacking in ingenuity.

(2) That an unsatisfactory irregularity exists in the quantities of some staple articles of food supplied ; a bare majority of diets being approximately correct in this particular (*i.e.* supplying an average quantity) whilst the remainder were either obviously deficient or possibly excessive.

(3) That insufficient attention is paid to palatability and attractiveness, especially in the matter of the provision of a reasonable variety of dishes ; breakfasts and teas providing the most common evidence of this defect.

(4) That, although the details with which we were provided did not enable us to construct an absolutely reliable arithmetical estimate of the value of each diet scale (in terms of proteins, fats, carbo-hydrates and calories), the result of analysis proved useful as confirmatory evidence, in cases where other indications suggested inadequacy or excess.

(5) That it proved especially difficult for us to ignore the great difference that exists between dietaries showing the lowest and highest calorie values respectively ; justifying a suspicion that the supply of

food in the former is insufficient. This conclusion received support from the increased incidence of tuberculosis amongst males in the 12 institutions providing dietaries of the lowest arithmetical value.

(6) That there seems to be some ground for suggesting that mental hospital dietaries may be deficient in certain accessory food factors (vitamins); probably deficient in fat-soluble A, and possibly also in water-soluble B.

(7) That, when markets are available, some modification in the usual methods adopted for obtaining supplies is desirable, with a view to securing a greater variety of meat foods, with due regard to economy.

(8) That every effort should be made to maintain a sufficient supply of high grade milk, the daily amount provided being inadequate in some mental hospitals and unduly restricted in others, and that, in order to secure good quality, especially in the matter of fat content, routine analysis is essential.

(9) That there are grounds for the suggestion that the complete substitution of margarine for butter has eliminated one of the most valuable sources for the supply of fat-soluble A, and that the partial reinstatement of butter is desirable.

(10) That some institution dietaries would be improved by the more frequent and regular supply of fresh (especially green) vegetables, and fruit, and that, in order to carry this into effect, the close co-ordination that exists in many institutions between the farm management and the person responsible for kitchen supply should be universal.

(11) That, although some mental hospital kitchens have been kept up to date, there are still many that are so inadequately equipped as to be incapable of anything more than the simplest routine cookery, whilst there are a large number that would be capable of still better work if provided with improved facilities.

(12) That there is need for greater attention, in many institutions, to kitchen organisation, methods of transport, and ward equipment, in order that the supply of hot food to patients may be secured.

(13) That there is reason to believe that smooth working, efficiency, and economy would result from the placing of all duties relating to the supply, preparation, and distribution of food, under the supervision of one individual, who should be responsible for their proper execution.

II.—THE DIETETIC NEEDS OF THE INSANE.

After (a) a close examination of the literature of all recent physiological researches into the food requirements of the general population and of some special sections thereof, (b) a study of certain detailed anthropometrical records of a sample of several thousands of patients detained in mental hospitals kindly supplied to the Committee by the medical superintendents of institutions (Appendix B, page 79), and (c) careful consideration of the records of a series of experimental measurements of the rate of basal metabolism in persons suffering from mental disease (Appendix C, page 91), carried out by Dr. C. G. Ainsworth, we have reached the following conclusions :—

(1) That no records of experimental evidence published since the issue of the "Report on the Food Requirements of Man" by the Food (War) Committee of the Royal Society (Harrison and Sons, March, 1919), throw any reasonable doubt upon the bases of calculation of minimum energy requirements for the general population adopted in that Report.

(2) That the bases there set out are as applicable to patients in mental hospitals as they are to the general population, with certain modifications to be detailed later.

(3) That the figures of body surface, used in that Report for the computation of minimum energy requirements, should be adopted as applying with equal force to the insane population, notwithstanding the fact that the mean height and body weight of normal persons (data used for calculating body surface) are somewhat greater than the average of the sample of measured patients in mental hospitals. Compared with the general population, mental hospitals contain a much larger proportion of congenital defectives of imperfect physical development, who eat disproportionately to their size, and a larger proportion of persons suffering from tuberculous and other wasting diseases, who need a supply of energy in excess of that calculated from their actual bodily measurements.

(4) That in the application of the principles of the Report of the Royal Society's Committee to patients in mental hospitals the only modifications necessary are the substitution of 11 for 8 hours' sleep, the longer period being considered desirable for patients suffering from mental disease, and the estimation of an average "work" allowance of 400 calories net energy for both sexes, or about one-third more than the Royal Society's Committee estimated for a tailor. The chief consideration that led to the adoption of the latter modification was the fact that, although only a comparatively small proportion do really hard work on farms or in gardens, kitchens, laundries, etc., others not so employed are expending energy for a fair part of each day in ward work, if only "pottering about", in restless or aimless movement in wards or airing courts, or in muscular exercise accompanying even moderate excitement or mental irritability. All such patients expend more energy during the course of a day than does a tailor at his occupation.

(5) That it is necessary to allow for patients in mental hospitals, as did the Royal Society's Committee for the general population (see Report, pp. 2 and 6), a 10 per cent. increase to represent the difference between food as purchased and food digested, and a further addition of 300 calories per diem for "locomotion." The Royal Society's Committee emphasised the necessity for this latter addition even in the case of "individuals who carry out their work in a room and do not have to undertake additional work to reach their place of business," on the ground that "such an allowance ought to be made in the case of the most sedentary occupation, even when carried out at home, since almost every individual requires a certain amount of muscular exercise in order to maintain health." We consider that these observations apply with still greater force to patients in mental hospitals.

(6) That upon the grounds detailed in the foregoing paragraphs the net energy requirements of male and female patients in mental hospitals, in terms of calorie values, may be calculated as follows :—

<i>Males—</i>						Calories.
11 hours sleep at 71·1 (basal metabolism)	..					782
8 hours awake at 92·4 (basal + 30 per cent.)	..					739
5 hours' work, viz. : 5 hours basal = 356 + 400						
calories.	..	..	..	..	..	756
						<hr/> 2,277
Add for locomotion	..	..	..			300
						<hr/> 2,577
Add 10 per cent.	..	..	..	..		258
						<hr/> 2,835
						<hr/>
<i>Females—</i>						
11 hours' sleep at 59·4 (basal metabolism)	..					653
8 hours awake at 77·2 (basal + 30 per cent.)	..					618
5 hours work, viz. : 5 hours basal, 297 + 400						
calories.	..	..	..	..	..	697
						<hr/> 1,968
Add for locomotion	..	..	..			300
						<hr/> 2,268
Add 10 per cent.	..	..	..	..		227
						<hr/> 2,495
						<hr/>

Or approximately 2,800 for males and 2,500 for females.

These figures should be regarded as standard *minimum* figures applicable to the ordinary population of mental hospitals, and there should be an addition of suitable energy values in the case of individual patients who are really actively employed.

III.—THE MODEL DIETARY.

It became obvious, at a very early stage in our enquiry, that any attempt to impose a hard-and-fast standard dietary, for use in all mental hospitals, would be doomed to failure. Patients vary in type in different institutions, those in some being drawn from a population that is mostly urban and in others from districts that are almost entirely rural ; each class differing to some extent in physical and mental characteristics, and each accustomed from childhood to its own standard of feeding. It must also be realized that institutions situated in thickly-populated districts are conducted under conditions that differ from those established in agricultural areas remote from busy

centres and out of touch with market facilities. It would, therefore, be impracticable to stipulate for the provision of a particular article of diet on any specified day for either ; something that would be possible for one to procure easily might prove to be a matter of great difficulty for another. Moreover, we consider it very important that nothing should be done to tie the hands of managing authorities to such an extent as to cripple enterprise or interfere with the exercise of ingenuity.

Notwithstanding this, the conclusions we arrived at, after an exhaustive enquiry into existing dietary conditions, indicated, without any doubt, that some definite effort should be made to remedy present defects. As, however, these defects have never been discussed in such detail before, and as we have received from time to time ample evidence of the willingness of visiting committees to co-operate in effecting improvements when the need for them is shown, we came to the conclusion that the immediate purpose of our enquiry would be served if we showed how they could be remedied ; leaving visiting committees the responsibility of carrying out the principles we recommend with such modification in detail as may be necessary to conform to local conditions.

With this object in view, we compiled a model dietary for use during winter months (October to March), which we considered should be capable of adoption in mental hospitals generally with a minimum of alteration.

This suggested winter dietary scale was circulated to the medical superintendents of all mental hospitals, with a request for their observations and criticism thereon ; all reference to any modification that might be desirable during summer months, or to substituted diets for sick persons, being intentionally omitted in order to avoid confusion of issue. This suggested dietary was well received, comments and criticism being directed for the most part to modifications in details, and only here and there to matters of principle. In all cases where reference to fundamental principles occurred marked divergence of view was evident, the majority of medical superintendents being in favour of those upon which our suggestions are based. Their comments regarding matters of detail were actuated in nearly all cases by the existence of special local conditions that gave rise to difficulty, or were made under a mistaken idea that the scale, as submitted by us, was intended to be a fixed one, for use in all institutions without modification. All representations made to us, whether on matters of principle or detail, were given careful consideration, with the result that many of the suggestions we received were adopted and incorporated in the dietary as finally amended, and reproduced in Appendix F hereto, page 103.

In considering this dietary it is impossible to place too much emphasis on the fact that we have no intention or desire to suggest that the model scale now submitted shall be regarded in any sense as a fixed dietary for universal use. Its real purpose is three-fold : (1) to serve as a model for the guidance of visiting committees in the construction of their own dietaries in accordance with local conditions,

(2) to show in the clearest manner possible what we regard as the food requirements for ordinary patients in a mental hospital, and (3) to demonstrate the possibility of providing a dietary, in which a reasonable variety is maintained, at a moderate cost.

The amount of uncooked meat suggested for roast, boiled or steamed meat dinners, in the draft diet scales we originally circulated, stood at 5 ozs. for males and 4 ozs. for females. In deference, however, to the opinion expressed by many medical superintendents, these amounts have, in the amended scale, been increased to 6 ozs. and 5 ozs. respectively.

These increases, the largest we feel justified in making, have been granted to meet what might be regarded as a reasonable criticism, and in order to obtain general agreement. The smaller amounts were originally suggested on the ground that, in our opinion, anything more than a very moderate meat diet is undesirable for the majority of patients in mental hospitals, and because the enhanced nutritive value of the other meals we suggest, renders larger amounts unnecessary. Moreover, we feel strongly that the waste of meat, in cooking and carving, owing to the inadequate provision of proper facilities for economical treatment, is far too great in many institutions, and that cooked meat ready for service should bear in weight a closer relationship to uncooked than is generally the case at present. There must be something wrong when one medical superintendent (voicing the opinion of others also) states that he finds in practice, "when dealing with frozen meat and fresh pork, that 8 ozs. of uncooked meat, including bone, yields little over 3 ozs. after cooking and carving." We think that if any authority desires to ensure the service to patients of a larger quantity of cooked meat than that provided for in our model scales, this should be secured by closer attention to the causes of waste in cooking and carving, not by increasing the uncooked ration. The 50 per cent. we have allowed for waste should be regarded as a maximum, capable of reduction.

Our suggestion that fish should form part of the diet of all institutions has met with some opposition. We have been told by many correspondents that, owing to lack of appreciation by patients, fish dinners have been discontinued in some cases for years past. This is confirmed by our analysis of dietaries (pages 70 and 74), which shows that the proportion of fish meals given in mental hospitals is only about 7·3 per cent. of all dinners provided throughout each year; also that in 46 hospitals fish is not given at all to ordinary patients. In the 49 institutions where fish dinners are given regularly, steaming or boiling is the method of cooking adopted in 42, and only in 7 is the fish fried as a matter of ordinary routine. The result of enquiry seems to indicate that the lack of appreciation complained of, and the consequent discontinuance of fish dinners, are due mainly to the method of cooking most commonly adopted—which generally results in the presentation of unappetising food to patients, and inevitable waste. The same objections do not apply when fish is fried, or served in the form of made dishes, for which reason we have adopted these methods of cooking to the exclusion of steaming and boiling, which we think should be discontinued, except in regard to the comparatively small amounts required for sick diets.

Further, exception has been taken to our selection of days for the service of fish, on the ground that the Friday fish day has become a "custom of the country" and that, as there are always some Roman Catholic patients under care in most mental hospitals, it becomes convenient (for kitchen reasons) to make Friday the fish day for all. With this we are not in agreement, believing that the advantages of the arrangement we suggest greatly outweigh its disadvantages. We are of opinion that the adherence to any particular day for fish conduces to monotony, and that a better and fresher supply is likely to be obtained if days are chosen other than the one upon which the demand for fish is general. We are given to understand that fish purveyors, knowing they have to dispatch large quantities of their wares to all parts of the country on Thursday, allow stocks to accumulate some days beforehand in order that demands may be met promptly. It is only reasonable to assume that the best quality fish, and the freshest, will go to markets where the best prices can be obtained; ordinary customers whose contracts are fixed, and cut as finely as possible, being supplied from the remainder. We believe that better quality fish will be obtainable, at the same price, if rush periods are avoided. The power possessed by the medical staff of ordering substituted diets is always available to meet religious difficulties, and kitchen convenience should in our view be subordinated to any institution arrangement that has for its motive the best interests of patients.

Although, in estimating the average consumption of bread for the purpose of our scale, and to indicate the amount to be sent to wards, it has been necessary to provide for a fixed quantity per head, it is not intended that the amounts mentioned should be issued to each patient whether likely to be required or not. The practice commonly adopted of issuing the major portion of a ration, to be followed later by a further supply if needed, is advocated as sound procedure. Should this be done, and the amounts stipulated in the scale be regarded as the average requirement per head for 100 patients, it will be found that the total quantity will not be exceeded, especially in view of the fact that bread and margarine (or butter) are supplemented in our proposed scale by other foods. Whole-meal bread should be substituted for white bread as often as it is found possible to give it without undue waste. In all institutions there are some persons to whom it is acceptable, and many who are indifferent to the colour and taste of their bread; to all such, brown bread should be given as often as possible, in order that advantage may accrue from its greater vitamin value. It is unfortunate that, because some patients will not take it, the issue of whole-meal bread has been completely discontinued in many mental hospitals. Germ* bread may be substituted for whole-meal bread.

We would also urge that butter should be substituted for some of the margarine now issued. In recommending a 25 per cent. substitution, as minimum, we have been influenced by contingent cost;

* See footnote to page 23.

but for this we should have been tempted to advocate a more radical change. We think, however, that if the 25 per cent. substitution is adopted the regular supply of milk increased, eggs given occasionally, green vegetables made a regular issue, and the use of uncooked green food and fruit encouraged, all reasonable vitamin requirements should be met.

We are fully aware that a substantial increase in the amount of milk issued would tend to cause embarrassment to some authorities, seeing that few institution farms are capable of doing much more than meet minimum requirements. Notwithstanding this, we feel that some addition to the daily provision for ordinary patients in many institutions is desirable; 1-16th pint for breakfast (page 66) and an equivalent amount for tea, being in our opinion a very inadequate supply—especially when its value has been impaired by subjection to a temperature of 212° F., or something closely approaching that figure, for 20 minutes to half an hour before service. We should like to see the beverage milk increased, and be assured that its addition to coffee, tea, or cocoa is only made at the last possible moment before issue, so that reduction in vitamin value may be minimised; but above all else, we desire that some amount of fresh milk of good fat value should reach patients regularly without treatment of any kind. Opportunity for this would be afforded by the supply of milk with porridge for breakfast, which, although small in amount (again for economic reasons) would help considerably if given regularly. Probably some institutions that are especially favoured may be able to increase the suggested 2½ ozs. ration without inconvenience.

During the last few years some mental hospitals have established poultry farms of considerable size, maintaining them subsequently in great measure by the labour of patients. When these farms have developed sufficiently to be productive, eggs therefrom have been used as supplementary food for ordinary patients. If some hospitals can do this successfully and, as they maintain, economically, there would seem to be every reason for urging a more general effort in the same direction. The general establishment of poultry farms would have the additional advantage of providing what has proved to be interesting and congenial work for patients—work of a more improving and healthy character than some of the processes of food preparation, that savour of drudgery and can be done better and much more expeditiously by machinery.

In advocating the regular and adequate provision of green vegetables for summer and winter use, the supply of fresh green foods as salads whenever they can be made available, and fresh fruit to be eaten uncooked as well as cooked during both summer and winter months, we feel that we are not asking more than is necessary or practicable. We find that of late some mental hospitals have very considerably increased their orchard and market garden areas, for the production of fruit and salad greenstuffs, and that, in addition, a fair number of them have contracted for supplies of oranges, apples and bananas for winter use when home-grown fruit supplies have become exhausted. We understand that at one institution more than two tons of tomatoes were

issued to patients last summer from home-grown sources. A recent revision of dietary scales for mental hospitals under the management of the London County Council includes a provision that "fresh fruit may be issued at a cost of not exceeding 3d. per head per week."

Bearing in mind the emphasis we found it necessary to place upon the comparative poverty of existing dietaries from a vitamin point of view (page 15 *et seq.*), our present insistence upon the issue of brown bread, the supply of butter in place of margarine, an increase in the quantity of milk, the issue of eggs, the adequate provision of green vegetables for cooking and salads, and the introduction of fruit (where not previously used) requires no further explanation.

One criticism of our original model dietary consisted of a complaint that it contained no provision for a supply of supplementary food to workers. This, however, was an intentional omission on our part, made as the result of very careful consideration, the following being the most important determining factors.

Amongst patients of both sexes in mental hospitals there are :—

- (1) Some who expend much energy in hard physical work, such as is represented by coaling, stoking and farm and garden work for men, and laundry and kitchen work for women.
- (2) Many who, although engaged in the same occupations, take things more easily, so that the expenditure in energy is proportionately less.
- (3) Persons who, owing to physical or mental inefficiency, or to daily variation in capacity for work, are regularly employed in light duties only—thus expending an uncertain amount of physical energy.
- (4) Those who, although physically fit, decline to work, or, owing to mental disease, cannot be trusted with the necessary implements for any kind of employment.
- (5) The turbulent, who, although not engaged in any occupation, are restless, excited and constantly expending energy equivalent to hard, or moderately hard, work.
- (6) The weak, physically unfit, and frail—idiots, low-grade imbeciles, cases of profound melancholia or dementia, etc.—patients who pass their time in a state of inactivity, expending little or no energy ; and
- (7) The sick and bedridden.

This extreme variation in the expenditure of energy by patients rendered the construction of a model dietary, scientifically adjusted to suit the requirements of all patients in mental hospitals, an impossible task. On the other hand, a large number of different scales regulated by the varied amount of energy expended by different classes was equally impossible to contemplate, especially as the line of demarcation between worker and non-worker is so ill-defined and variable from day to day.

In these circumstances, we decided to regard all inmates of mental hospitals as falling within one or other of two categories—(a) the physically fit, or approximately fit, whether workers or non-workers

(1 to 5 inclusive of the above categories), and (b) the infirm and sick (6 and 7). By taking this course we separated ordinary patients, who are living an approximately active life, from those who are expending little or no energy; designing a model dietary for the former only, and leaving the latter to be dealt with as sick persons in need of special food adjusted to their particular requirements under medical order. On this basis we estimate that our model dietary should apply to nearly 75 per cent. of all patients in mental hospitals.

The arithmetical analyses of the dietary scales supplied to us at the commencement of our enquiry showed a disproportionate calorie value between the diet of workers and that of non-workers—the enhanced value of the former being due to additional food given as reward for work done. In some instances the evidence seemed to point to the diet of non-workers being barely sufficient, whilst that for workers had in general the appearance of being generous; a condition doubtless designed to encourage work, for therapeutic and economic reasons. Whilst we are in full agreement with the exercise of all reasonable efforts to induce patients to occupy themselves for their own advantage and that of the community, we are not satisfied that reliance upon additional food to produce this result is altogether justifiable. It must be remembered that amongst the unemployed are many who are physically unfit for regular work and who, in consequence, need a good dietary for therapeutic reasons, and many who are non-workers because of mental disease, although physically fit. Moreover, it is impossible to avoid the conclusion that the incidence of tuberculosis, dysentery and other diseases likely to attack patients of low vitality is greater amongst the unemployed and unemployable in mental hospitals than amongst other classes. Although there are other determining factors of importance that partially account for this, we think that if the full dietary is extended to non-workers also, so far as it can reasonably be, the incidence of these diseases will be proportionately diminished. It will be seen later that the average calorie value per head per 100 patients is good enough to permit of trivial adjustments as between workers and non-workers; but, if more than this is required, the remedy lies in the establishment of a token system and the provision of facilities for the purchase of luxuries such as tobacco, sweets or articles of any description likely to afford pleasure and stimulate effort. Our evidence seems to indicate that, where the token system has been introduced, the result has proved satisfactory.

In a previous section of this report we showed that the standard minimum requirements per head for the general population of mental hospitals amount to 2,800 calories per day for males and 2,500 for females, without prejudice to the addition of suitable energy values in the case of patients actively employed. As this estimate was based upon a consideration of patients as a whole, including the infirm and sick, it is obvious that, if the latter be excluded, some material addition must be made to the calorie values required by the 75 per cent. to which the model dietary applies—especially as this number includes all persons actively employed, who constitute some 50 to 60 per cent.

of the mental hospital population.* To add less than 15 per cent. on this ground might be inadequate ; this addition brings the figure up to 3,220 calories for males and 2,875 for females, thus :—

		Males. Calories.	Females. Calories.
Standard minimum requirements	...	2,800	2,500
† Add 15 per cent. addition for workers	...	420	375
Total calories	... ..	3,220	2,875

It will be seen by the tables in Appendix F (page 113) that the daily nutritive and calorie values of our suggested dietaries are as follows :—

Sex.	Proteins.	Fats.	Carbo- hydrates.	Energy values in calories.
	Grms.	Grms.	Grms.	
Males	97	123	417	3,255
Females	89	118	370	2,978

which agrees very closely with our estimate of physiological requirements.

Our scheme for a model dietary for ordinary patients to meet these requirements is the simplest we can devise. So far as breakfasts and teas are concerned, certain articles are suggested as regular issues, a list of “extras” being added from which one can be selected daily for each meal. For dinners a collection of meats, made dishes, soups, puddings and accessories is presented, from which a succession of meals can be provided, together with some sample scales (pages 105–112) showing how this can be done for four consecutive weeks to the complete elimination of monotony. The exact amounts of each article for 100 patients, males and females respectively, are also given, with, in addition (pages 115–120), some formulæ for the constitution of the principal made dishes—in the interests of uniformity and economy. The adaptation of these scales to the needs of particular districts is left to the discretion of the local authorities concerned, provided (a) that the nutritive and calorie values are not below those of our model scales ; (b) that any dietary so constructed shall be as free from monotony ; and (c) that full consideration is given to our suggestions for securing the vitamin sufficiency we regard as essential.

* Returns made to the Board of Control show that the weekly average number of persons employed throughout 1923 amounted to 60 per cent. of the total mental hospital population in the case of males, and 56 per cent. in the case of females.

† This added percentage brings up the total allowance for work to about 750 calories, which corresponds (*see* Report of Royal Society’s Committee) to the requirement for work between “light” and “moderate.” This we believe to be no more than is adequate.

Our answer, therefore, to the direct question, put to us in our terms of reference, as to whether or not a minimum dietary should be fixed, is in the affirmative. Whilst we do not consider it desirable to go so far as to suggest that the details of particular dishes to be given on particular days shall be fixed, we are of opinion that no dietary for ordinary patients in any mental hospital (including both workers and non-workers, and excluding the infirm and sick) shall be allowed to fall below the nutritive and calorie values of our model. If this be secured we think the exact foods given to obtain the desired result and the days on which they are given, are immaterial. This, however, must be subject to the definite proviso that no dietary shall be less varied in character than is indicated in our model scales, and that the lines we have laid down with a view to securing a certain and adequate vitamin supply shall be complied with in their entirety.

Substituted dietaries for the infirm and sick.

The dietetic requirements of the infirm and sick are matters that must be left to the discretion of the medical staff; for which reason we originally decided to limit the scope of our recommendations to the needs of ordinary patients.

Owing, however, to representations that were made to us, by medical superintendents and others, suggesting the incompleteness of such a course, and the desirability of the existence of an outline scheme applicable to the infirm and sick, we were induced to reconsider our decision. The interests of uniformity, convenience, and economy, being additional arguments that appeared to justify this reconsideration.

We accordingly resolved to depart from our original intention only to the extent of submitting a collection of graded scales applicable to persons for whom the ordinary diet is considered unsuitable, and without prejudice to the fact that the entire responsibility for the dietary of the infirm and sick must finally rest upon the medical staff.

The substituted dietary scales set out in Appendix F (facing page 114) are therefore merely tentative suggestions, submitted in the hope that medical officers will use them so far as they can be made to meet the needs of their cases, in order that experience of their value or otherwise may be available when, in the event of their existence being justified, future revision is contemplated.

In order (from the standpoints of uniformity, convenience and economy) to obtain the greatest value from organised dietaries for these classes, and to prevent the possibility of patients being retained on a low diet longer than is necessary, we are of opinion that accurate diet records should be kept in each ward. We therefore recommend the institution of a system of ward dietary sheets showing at any time the number of patients on each diet, and the names of all those on substituted diets. Entries on these ward sheets, in the case of ordinary and infirm patients, should be subject to monthly revision as a matter of routine, all such diets remaining in force for that term, unless a shorter period is definitely stated, or unless the diet for any particular patient is previously revised. Sick diets, as in general hospitals, should, of course, be subject to daily revision. It will only be necessary then

for a charge attendant or nurse to supply the steward, on a daily summary form, the number of each of the separate dietaries required for his or her ward, to enable him to send to the kitchen the quantity of food in bulk required for the various diets ; the officer in charge of the kitchen being provided later with a detailed statement of the number of diets of each kind, and the quantities of food, required by each ward. The summary for the whole institution, when finally prepared by the steward, should each day be submitted by him to the medical superintendent ; the latter being thus afforded an opportunity of ascertaining in concise form the details of all diets supplied to each ward. Emergency orders should be made out in a ward carbon duplicate book, signed by the medical officer in charge, and sent to the steward. This system, so far as it relates to administrative measures in dealing with ordinary and substituted diets, and to periodical revisions, is now in force in several mental hospitals.

The periodical weighing of patients.

We think it necessary to state here, explicitly, that existing means for gauging the sufficiency of diets are not so satisfactory as we should like to see them. We have not been able to form a high opinion of the accuracy of the routine weighing of patients, and, although we are very far from thinking that any purely mechanical criteria can compare in value with the judgment of a physician upon the progress of his patients, we have no doubt that more use could be, and should be, made of records of change of weight. We think research in this field should be encouraged, and that, in all public institutions, regular weighings *under standardised conditions* should be made and recorded. Diversity of practice has rendered comparison between different institutions difficult, or impossible, so much so that (as noted in Appendix B) our statistical observations on the weights of patients have proved very unsatisfactory. The weighing of patients can be done most conveniently on bathing days, using a minimum of clothing, the absolute weight of which is known. The weighing of patients is useless unless the actual naked body-weight can be ascertained.

IV.—ADMINISTRATIVE IMPROVEMENTS NECESSARY TO CARRY OUT THE MODEL DIETARY.

If the dietary we have outlined is to be adopted, attention will first have to be paid to the question of control over the processes through which food passes to its final service, and to the adequacy of kitchen control and equipment. No material progress is likely to be made until these matters have received full consideration by the managers of institutions. To attempt to carry out our suggestions under the conditions that now exist in many hospitals would be unsatisfactory in result, and prohibitive in cost.

Food Control.

Food, in the shape of raw material, is obtained from two main sources—from hospital farms, and from purveyors. It passes to the kitchen for cooking and distribution, and then, by various means, to wards and dining halls for service to patients. Thus three departments are involved—one for supply, a second for cooking and distribution, and a third for service.

In the majority of mental hospitals each department is separately controlled, farm bailiffs being responsible for farm produce ; stewards or storekeepers for purchased food ; stewards, matrons, housekeepers or cooks for cooking and distribution, and head attendants and matrons for ward service. Although we are satisfied that medical superintendents take the most serious view possible of the catering question, and do their utmost to secure efficiency by constantly interviewing subordinates in charge of each department, visiting farms, stores, kitchen, and wards, at frequent intervals, we think the control of all these departments should be delegated to a responsible officer working under him. This would relieve the medical superintendent, so far as catering is concerned, of all matters of routine character, the officer suggested being responsible for working out in detail such instructions as may be issued to him on broad lines, he attending at the same time to any shortages, substitutions, or irregularities, that occur. Such an arrangement would focus the responsibility for error upon one individual, and prevent the difficulty that often arises in apportioning blame. The placing of an officer in charge of all feeding arrangements is only carrying out the principle of delegation already adopted in regard to other phases of mental hospital work. We feel that much improvement and saving could be effected if, after the medical superintendent has designed a dietary, the practical business arrangements in connection with its application were placed in the hands of a responsible person.

During our visits to hotels and restaurants, all of them establishments conducted on a purely commercial basis, we were impressed by the extreme care exercised to secure efficient delegation. In these institutions the departmental principle is highly developed, subordinates reporting to sub-managers, and they in their turn to the chief, with perfect co-ordination as the result. The keynote of all these places was efficiency with the strictest possible regard to economy in details. The administrative heads of all of them were unanimous as to the necessity for a high rate of remuneration for their catering sub-managers. In this regard the words of one represents the opinion of all—"it pays over and over again : they can save us thousands." Such caterers, in all cases, supervise supply, cooking, distribution and service, being responsible also for the prevention of waste, and the economical utilisation of the by-products of cooking. They are all experienced men, whose speciality is the production of the best food at the lowest cost. If companies, whose dividends depend upon close attention to details, regard these as sound business lines, we cannot but think that their general adoption in mental hospitals would lead to improved efficiency and economy. Some large general hospitals have adopted these principles in their entirety : at St. Bartholomew's, for instance, we

found a kitchen superintendent whose duties included the purchase of food, and supervision over its cooking, and distribution to wards.

The problem as to which officer should assume the duties and responsibilities of catering in mental hospitals does not appear to us to be a difficult one. The matron or housekeeper (where such a person exists) have too many other claims upon their services to permit of the allocation of more than an hour or so each day to the kitchen department, which is but a fraction of the time necessary to effect the purposes we have in view. Moreover, these officers, generally speaking, are not sufficiently trained in cookery and kitchen economy to exercise influence over a cook who has come to believe that his or her routine methods cannot be improved upon, or provide that continuous guidance and supervision that are essential to the fulfilment of the principles we advocate.

Modern improvements in the treatment of the insane bid fair to increase rather than diminish the work of the nursing staff, and some changes in the duties and responsibilities of nurses that are likely to be suggested will tend in the same direction. It is probable, therefore, that the matron will have even less time to spare for the kitchen in future than she has had in the past.

Some mental hospitals (26 are known to us) have placed in the hands of their stewards the duty of food control from supply to distribution, including service so far as dining halls are concerned, but not wards.

The position of the steward of a mental hospital, as food supply officer and as the person more concerned than any other with business details, points him out as the one most fitted to assume the duties associated with food control, provided he has, or will acquire, a thorough knowledge of institution cookery and its possibilities. Our evidence goes to prove that, in general, where the steward has been appointed as food controller, with the grant of reasonable responsibility, the success of the experiment has been undoubted. In this work, as in every other responsible vocation, the personal equation is a most important factor. Some persons will prove unequal to the task, but this does not affect the principle.

It must be remembered that (with the exception of those mentioned above) stewards have not been appointed in the past with a view to their undertaking the duties of caterers in the complete sense of the word—including supply, cooking, distribution and service. Some would therefore not be fitted for the execution of the wider duties, whilst others might be able to render themselves fit by thorough training under skilled instruction. We have been in touch with steward-caterers who are fully capable of giving this instruction, and the training grounds are available. We also understand that the Association of Clerks and Stewards of Mental Hospitals, for some time past, have had in contemplation the provision of the necessary facilities for education, by instituting a series of courses of instruction, and subsequently issuing certificates of proficiency to successful candidates after examination.

We advocate, in order to secure a better food supply and greater economy, a general improvement in the status of stewards, and the

gradual conversion of the holder of this post from one who is now little more than a machine into an administrator with responsibility, and proportionately increased remuneration. We feel sure, in suggesting this, that the creation of such posts, if made worth having, would conduce to fitness, and that the additional expense incurred would be recouped over and over again from resulting economies. We do not suggest, however, the wholesale transformation of existing stewards into food controllers because they happen now to be stewards, or any general disturbance of existing conditions in order to bring such a scheme into force immediately. The development must of necessity be a gradual one.

It must also be realised that the steward is regarded by the district auditor as the institution accounting officer, and the person responsible for all expenditure on food, whether home-grown or purchased. The steward may at any time be required to produce details concerning its economical disposal, explain waste at any point, and give satisfactory information as to the utilisation of unused material, or the by-products of cooking. The question of accounting must arise on these and many other matters connected with cooking, kitchen equipment and distribution. The auditor's power to surcharge the steward for undue expenditure, catering losses, and unnecessary waste is one that cannot be transferred to any other officer. In the event of the steward being given the wider duties outlined above, the knowledge that this power over him exists would stimulate economy in a way that could apply to no other person. The very existence of the power of surcharging this officer seems to indicate that the post of steward was intended to be one of greater responsibility than is generally recognised.

There are many reasons that will prevent mental hospital stewards from personally supervising, in the same way as is done in hotels and restaurants, all feeding arrangements from supply to service. Whilst this is workable, and desirable so far as dining hall service is concerned, ward feeding renders it more difficult. It is essential, however, that some means should be devised in the latter case, to enable the food controller to be in close touch with a person attached to each ward. After all, the condition of food when actually served to patients, its temperature, its sufficiency, whether appreciated and eaten, or not appreciated and wasted, are the most important factors of all, with which the food controller should be fully conversant.

Kitchen Control.

Given, however, the most perfect general supervision, the whole scheme for dietary improvement will break down unless the person responsible for the actual preparation of food for the table is able to undertake the work intelligently, under the guidance of the person who is responsible for general direction. There must be perfect co-operation between the two, with willingness on the part of the kitchen worker to abandon old routine methods, adopt new ones, and show readiness to exercise ingenuity in the production of a dietary at the lowest cost compatible with a good and varied scale. To design a good dietary

and neglect to provide for skilled execution will be waste of time and material. As kitchen helpers are often appointed without any experience or knowledge of cookery, it is essential that the head of the department should be capable of imparting instruction to them.

When we take into consideration the fact that the head of the kitchen is responsible for providing food of varying character for many different classes—medical officers, matrons, head attendants, and other departmental officers, attendants, nurses, private patients, and rate-aided patients—the importance and responsibility of the position are apparent. Especially so when we realise the many thousand pounds' worth of material passing in one way or other through the kitchen of an institution of average size during the course of a year, the facility with which waste occurs, and the foresight and continual supervision necessary to secure economy.

We mention these points to emphasise our opinion that great care should be exercised in the choice of the head of the kitchen staff, a necessity which we think is not always appreciated. Our evidence, indeed, seems to point to the conclusion that the conditions appertaining to such an important post are not made attractive enough to secure the services of well-qualified persons.

As improvements, we recommend the abolition of the designation "cook" as denoting more a domestic servant than a responsible officer, with the substitution therefor of "kitchen superintendent," or "kitchen supervisor." The better-class persons we have found holding such posts in mental hospitals, and other institutions, work well with their helpers, maintain good discipline, and have a keen eye for possible economies. Such a scheme would no doubt necessitate a higher rate of remuneration, but this is indicated in any case in many hospitals, and should be made dependent upon efficient administration.

The salaries paid to head cooks at present are, in many cases, disproportionate to the importance of the post, and the diversity of view taken by different authorities as to what is a suitable remuneration is not easily explained. The salaries shown in the following table are gross—i.e., subject to the usual deductions for living expenses. Institutions having more than one kitchen are not included therein.

Total hospital accommodation, staff and patients.	Approximate annual value of food passing through kitchen.	Range of salaries.	
		Lowest.	Highest.
	£	£	£
Under 500	7,500	94	174
500–750	9,500	112	165
750–1,000	12,900	116	206
1,000–1,500	17,500	114	194
1,500–2,000	25,000	144	234
2,000–3,000	32,000	186	219

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Having regard to the magnitude of the responsibility the amounts shown in the fourth column are small enough, those in the third inadequate. It is impossible to obtain skilled persons at the latter salaries, and, should anyone suitable take up the work, there is little probability of obtaining willing service in the interests of the managers of an institution by whom they are underpaid. Very recently one visiting committee offered, by advertisement, £119 a year for probationer nurses, without requiring experience of any kind; another, in the same paper, apparently considered £114 sufficient for a head cook who is feeding some 1,250 persons daily, and handling each year, approximately, £17,500 worth of material.

Kitchen Equipment.

In a previous section of this report (page 24, *et seq.*) we discussed, in some detail, the existing equipment of mental hospital kitchens, indicating the deficiencies that have become evident in some of them, and the means by which improvement can be effected. In view of this it seems unnecessary to do more here than enumerate, with brief references, the improvements we then suggested, and emphasise our conclusion that, in some mental hospitals, it will be impossible to produce a more varied dietary unless better cooking facilities are provided. The only alternative would be an unjustifiable increase in paid labour. We fear that in some cases such improvement in equipment as is unavoidable will entail material expenditure. Apart altogether from the question of an improved dietary, the provision of more up-to-date equipment in some institution kitchens is, in our opinion, long overdue.

The following list includes items of equipment of proved value only. Some hospitals possess practically all of those mentioned therein, others are supplied with some of them, whilst a third section possesses few or none. All are referred to because, without exception, they are useful adjuncts from an economic standpoint, and we have had evidence that the installation of most, if not all, of them has resulted in a material annual saving in expenditure. As there is not likely to be another inquiry of this nature for some time to come, we have made the list as complete as possible for the advantage of those who may from time to time desire to replace, or supplement, their existing equipment.

1. Under present conditions the waste that occurs in the roasting of meat by ordinary fire or gas ranges is unduly great. These appliances for the roasting of a large number of joints of various sizes are out of date, and considerable saving in food and fuel is found to result from the substitution of steam-heated draw-plate ovens. We think that every hospital kitchen should be fitted with one, in addition to that in the bakery, which cannot always be available when required for kitchen use.

2. Many kitchens are not adequately supplied with hot plates and hot cupboards; in a few there are none at all. The impossibility of cooking a sufficient supply of food at one time (*e.g.*, in fish-frying) renders it necessary to make provision for maintaining the tempera-

ture of the material first dealt with until the last is ready for service. Hot plates or cupboards are also necessary to prevent loss of heat during unavoidable delays in service.

3. The installation of fish-fryers is gradually becoming more general. We are of opinion that they should be available for use in all mental hospital kitchens.

4. It is difficult to attach greater importance than we have already expressed to the value of a machine for various purposes of the "Hobart mixer" type. Its value is undoubted, and we are convinced that it will sooner or later become part of the normal equipment of the kitchen of every large institution. The economies it can be made to effect are many, and we anticipate that the adoption of the model dietary in its entirety will be difficult without its aid.

5. Three machines in common use—the Berkel slicer, a bread-cutting machine, and a vegetable-paring machine—are valuable kitchen adjuncts, and economical labour-saving aids to food preparation and distribution. Whenever possible, these should be motor-driven.

6. Sufficient attention is not paid as a rule to the provision of stockpots. Every kitchen should have two, steam-jacketted, one in use and one clean. The collection of material for soups is facilitated thereby, and considerable saving effected in dripping.

7. Although ordinary steam boilers can be used in the absence of appliances made for the purpose, many benefits accrue from the provision of a specially designed tea infuser, egg cooker, and steam-jacketted boiler for making jam.

8. A few appliances that are more in the nature of desirable acquisitions of an inexpensive character than necessities deserve mention. They conduce to the economical preparation of food. Amongst them are such articles as ham boilers, pudding containers, and meat presses.

9. Those hospitals that are equipped with cold-storage accommodation possess great advantages over others, the value of such provision being especially evident when a glut in the market permits the economical purchase of some perishable article not immediately required for use. The advantages of the existence of cold-storage during summer months are too obvious for comment.

V.—THE COST OF THE ADOPTION OF THE MODEL DIETARY.

Our original programme included an enquiry into the cost of existing dietaries, in order that a comparison between present expenditure on food and the cost of the adoption of our model scale might be possible. Although our examination of existing scales revealed the need for improvements, and although we felt that additional expenditure where necessary would have to be faced, we were satisfied that an adequate scale could be designed at little (if any) additional cost, provided proper equipment was available, and due regard had to economical administration.

Unfortunately for this intention, an accurate estimate of current dietary expenditure could not be obtained, as so many mental hospital

authorities, owing to the system of accounting in force, are unable to produce details concerning food supplied to their patients as distinct from that provided for staff. We strongly urge the desirability of separate accounting in future, as is done, for example, in the poor law institutions in England and Wales, in establishments under the control of the Metropolitan Asylums Board, and in prisons under the management of the Prison Commissioners. If exact data regarding expenditure on food for patients were available for each mental hospital, uncomplicated by staff issues, visiting committees would be in a position to make useful comparisons, and discover in what details their figures are above or below the average. In the absence of such information it is difficult, if not impossible, to decide whether an institution is conducted with due regard to economy or not, and, if not, where the fault is to be found. When food expenditure for staff and patients is grouped under one heading, the total cost of the two may not call for comment; whereas, if dissected, it may be found that the outlay on patients' account is unreasonably low, and that for staff unnecessarily high.

In order to obtain some definite data on which to base an estimate of the cost of the suggested model dietary, we circulated copies to medical superintendents throughout the country, accompanied by the schedule reproduced in Appendix H (page 125). This schedule contained the exact quantities of all articles for an average week for 100 patients, 50 of each sex. Each institution received the same form, on the same date (in March, 1923), and each was asked to supply us with details as to what it would cost to provide each article separately, and the whole together. The result is set out in the Appendix last referred to (page 126, *et seq.*), together with an analysis showing differences in cost of the chief items of expenditure.

Bearing in mind that the amounts appearing in this table represent the estimated cost of providing at each institution identically the same quantities of definite articles of food, the result is astonishing. In one mental hospital the total cost of these provisions is £33 17s. 10d., with a range of values at other places down to the lowest, £18 2s. 2d. Although we anticipated that locality would have some bearing on cost, we did not expect to find such a material difference as is disclosed.

It is evident that extremes of estimated cost are conspicuous under every item of expenditure—due, in part, either to lack of uniformity in methods of purchase, to variety in character of material obtained, to the accessibility or inaccessibility of markets, but in the main we think to the absence of any proper principle governing the charging up of home produce at regulated prices.

These serious variations in statements of cost would largely be removed by the adoption of better business methods—notably by the appointment of an officer for the control of food supplies whose duty it would be to keep in touch with price fluctuations, buy at the most favourable time in the best markets, and charge up farm produce at current local market rates. To make this possible of extension to perishable as well as other articles, facilities for cold storage are essential. In addition to this, great advantage would accrue from close association and co-operation between the

food supply officers of different mental hospitals, especially those situated in contiguous neighbourhoods. It would, we think, pay visiting committees to make financial provision to enable such officers to attend periodical conferences with this object in view.

Our enquiry into food prices has again demonstrated the folly of working in watertight compartments. Knowledge by one man as to what is being done by another in the matter of obtaining food of the best quality at the lowest possible price would stimulate healthy competition to the advantage of all concerned.

The average cost of our model dietary for the whole 95 institutions, as shown by the returns supplied to us, works out at about 8·2 pence per head per day; approximately 8·1 pence for county mental hospitals, and 8·5 pence for borough institutions, which, for the most part, are smaller in size. In 65 instances the cost per head is 8·2 pence or less, down to as low as 6·2, and in 39 institutions the cost is over 8·2 pence, up to a maximum of 11·5. The average of the 56 institutions, including and below 8·2, works out at 7·6 pence per head per day. It is evident therefore that 60 per cent. of all who estimated their expenditure on the quantities in our schedule (page 125) estimated that they could provide the material at an average cost of 7·6 pence per day.

In view of the great difference in the figures supplied to us, we felt some hesitation in founding definite conclusions thereon. We therefore asked the authorities of a large mental hospital situated in the London district to supply us with an exact estimate of the cost of adopting our model dietary (as finally amended), based strictly upon contracts in force on 20th March, 1924. This hospital provides food for from 1,400 to 1,500 persons daily, and the managers thereof purchase their entire supply of food from outside sources—including bread, potatoes, vegetables, milk and all other articles—nothing of any kind being home produced.

According to contract prices ruling on that date we were informed that the model dietary as finally amended could be provided in its entirety for 100 patients (50 of each sex) at a total cost of £22 17s. 5d. per week; the allocation under each heading of expenditure being—meats, £4 17s. 6¼d.; bacon, 9s. 2¼d.; suet, 13s.; fish, £1 8s. 8½d.; bread, £3 6s. 9d.; margarine and butter, £1 4s. 3¼d.; potatoes, 16s. 7¼d.; dried fruits, 12s. 10½d.; cheese, 5s. 8d.; vegetables, £1 3s. 10½d.; beverages, £1 9s. 3d.; milk, £2 14s. 0½d.; sugar, £1 14s. 8½d.; cereals, £1 7s. 5d.; and jam, 13s. 6½d. This works out at about 4s. 7d. per head per week, or 7·84d. per head per day. It is obvious that the outside purchase of all articles of food by the managers of this institution means the inclusion of a purveyor's profit in the price of everything, which seems to indicate that a mental hospital making bread, and producing other articles such as potatoes, vegetables, milk, fruit, etc., should be able to provide the same materials at less cost. There should, at any rate, be a balance available from the reduced cost of home-produced food that would help to compensate for the less advantageous conditions existing in some neighbourhoods in regard to articles of diet that must be purchased.

Although not quite comparable, the similarity between the 7·84*d.* per day estimated by the institution in question and the 7·6*d.* referred to earlier in this chapter (as the amount obtained by averaging the estimates of 60 per cent. of all mental hospitals) is significant.

But, having regard to varying facilities for purchase, we recognise that it would be unfair to state a figure that may not be a possible one for some institutions, and only a barely possible one for others. Moreover, as the result of replies to the circular to medical superintendents that accompanied the costing schedule, we have found it desirable to make certain changes in the model dietary as originally designed, in order to bring it, so far as possible, into accord with the wishes of our many correspondents. These changes, taking into account reductions and additions, have increased the cost of materials by about ·75 pence per head per day.

As the result of these considerations we have arrived at the conclusion that, assuming the provision of adequate kitchen equipment, and the adoption of the most economical methods of purchase, methods that should be possible everywhere, the cost of the model dietary as set out in Appendix F (page 103) should not exceed 8·5 pence per head per day for patients in county mental hospitals, and 8·75 pence per head per day for those in borough institutions—4*s.* 11½*d.* and 5*s.* 1¼*d.* per head per week respectively.

Although we are unable to say definitely how these figures compare with present cost, we think they do not exceed, or materially exceed, existing expenditure on food in the majority of hospitals. In any case, we are of opinion that no local authority can consider the amounts as other than economically justifiable. A proper diet is of essential importance, and we are satisfied that the one we suggest meets the needs of the human body, will secure the proper nourishment of patients, and will promote their happiness.

VI.—CONCLUSIONS AND RECOMMENDATIONS.

1. That there should be more uniformity in the construction of mental hospital dietary scales, especially in regard to—

- (a) the character of food given;
- (b) its total amount;
- (c) the amounts of certain staple articles of diet; and
- (d) the avoidance of monotony.

2. That the average calorie values of dietaries for ordinary patients in mental hospitals (including workers, and excluding those on substituted diets) should not fall below 3,220 for males, and 2,875 for females.

3. That to ensure the presence in dietaries of necessary accessory food factors (vitamins) there should be a partial reinstatement of butter as a regular article of diet, a supply of milk in greater quantity, an increased provision of green and other fresh vegetables, a more common use of eggs, a free administration of salads and fresh fruit, and a more general use of wholemeal or germ bread.

4. That, as these improvements would be secured by the adoption of our suggested model dietary, and as, under proper conditions, the cost of this dietary at present prices should not exceed $8\frac{1}{2}$ d. per head per day for county mental hospitals, and $8\frac{3}{4}$ d. for borough institutions, we commend its general adoption in public mental hospitals, with such modifications as may be necessary to meet varying local conditions.

5. On grounds of economy as well as efficiency it is important:—

(a) to establish a unified food department in each institution, under a competent and responsible head, for dealing with the supply, cooking, distribution, and service of food;

(b) to provide each institution with adequate kitchen equipment;

(c) to endeavour to secure, as kitchen workers, the services of persons more highly skilled in cookery by making these posts more remunerative and attractive. This refers more particularly to the responsible head ; and

(d) to pay greater attention in many hospitals to other points dealt with in the body of this report relating to the cooking, distribution and service of food.

6. That substantial economies can be secured by paying greater attention to the terms of specifications and contracts, and by taking more advantage of wholesale markets.

7. That, in regard to food expenditure, separate accounting, as between patients and staff, should be the rule in all mental hospitals.

8. That it would be a great advantage if an officer skilled in these details could be appointed on the Board of Control staff temporarily, to advise and assist Local Authorities in regard to the adoption of the model dietary.

In conclusion, we desire to acknowledge the marked ability with which Mr. Harold J. Clarke has discharged his duties as Secretary to the Committee. He has rendered most valuable service throughout, and has been of the greatest possible assistance to us.

(Signed) R. W. BRANTHWAITE.
L. O. FULLER.
WM. J. GIBBS
M. GREENWOOD.
PERCY T. HUGHES.
R. WORTH.

HAROLD J. CLARKE,
Secretary.

Dated May 20th, 1924.

APPENDIX A.

AN ANALYSIS OF MENTAL HOSPITAL DIETARY SCALES.

In compliance with a request made in March, 1922, the Medical Superintendents of 95 Mental Hospitals supplied, for the information of this Committee, details of the dietary scales in force in each. From these documents it was evident that all institutions provided three chief meals each day—breakfast, dinner and tea—whilst about 42 added a light lunch for workers, and six something in the nature of an evening supper.

The lunches referred to were apparently provided solely for the benefit of persons employed in farm and gardens, workshops, laundries, kitchens and sewing-rooms, and the suppers were for convalescent cases, or quiet chronic patients who were permitted to sit up later than the usual hour for retirement. Few details were given as to the constitution of these light lunches and suppers, they being for the most part considered as unofficial additions to the dietary—privileges to be granted, or otherwise, at the discretion of the Medical Superintendent. Such indications as were available, however, seemed (for lunch) to point to some beverage (such as tea or cocoa), a slice of bread with cheese, jam or margarine, a piece of cake or a biscuit. For suppers one hospital definitely outlines a variety during the week consisting of milk pudding, soup, fruit pudding, minced meat and vegetables, bread and cheese, or cocoa and cake. A second limits its supply to porridge, and this to males only; a third provides Oxo and bread; a fourth bread and cheese and coffee; and the remaining two institutions cake only.

Breakfasts are usually served between the hours of 7.30 and 8.0 a.m., dinners between 12.30 and 1.0 p.m., and teas between 5.0 and 6.0 p.m.

BREAKFAST.

The basis of this meal throughout the year consists of coffee, cocoa, or tea, with bread and margarine. In many hospitals a daily supply of porridge is given in addition to, or in lieu of part of, the bread and margarine; whilst in others this article of diet is given less frequently, or regularly only during winter months. In a comparatively small proportion (14.3 per cent.) of breakfast meals a savoury dish consisting of bacon, sausage, preserved meat, brawn, galantine, or fish is added to the bread and margarine. In a smaller proportion still (3.9 per cent.) the dietary scales for this meal include jam, marmalade, or syrup, the last named being provided (in the main) for use with porridge. In some hospitals porridge is apparently served without (or with very little) milk, and with no sugar or syrup. At 32 hospitals breakfast all the year round consists of a beverage, with bread and margarine only. So far as solid food is concerned, of all breakfasts given during one year in mental hospitals, 48.5 per cent. consist of bread and margarine only, and 33.3 per cent. of bread and margarine with porridge. The breakfasts, therefore, consisting of bread and margarine only, or these articles with porridge, total 81.8 per cent.

Beverages.—These consist either of tea, coffee, or cocoa. At some hospitals the same beverage (generally cocoa) is supplied for all patients throughout the year, whilst others provide for a choice of two or three, as follows:—

48	hospitals	provide	one	beverage	only;
28	„	„	a	choice	of two, and
19	„	„	„	three.	

The quantity generally allowed is one pint per patient. The ingredients for beverages show marked variation. The allowance for the tea beverage, for instance, ranges from 10 to 16 ozs. of tea to 100 pints of water, and the sugar to sweeten this from less than 3 lbs. to $4\frac{3}{4}$ lbs. per 100 pints.

1	hospital	allows	4 $\frac{3}{4}$ lbs.	sugar	per	100	pints	water.
1	"	"	4 $\frac{1}{4}$	"	"	"	"	"
15	"	"	4	"	"	"	"	"
1	"	"	3 lbs.	14	ozs.	sugar	per	100
4	"	"	3 $\frac{1}{2}$ lbs.	"	"	"	"	"
1	"	"	3 $\frac{1}{4}$	"	"	"	"	"
24	"	"	3 lbs.	2	ozs.	"	"	"
48	"	"	3	"	or under	"	"	"

So far as can be gathered from the dietaries (some do not mention quantities), the supply of milk for breakfast for ordinary patients (excluding sick) varies from $\frac{1}{6}$ pint to $\frac{1}{2}$ pint per head, with an average allowance of about $\frac{1}{7}$ pint. So far as the supply of milk is concerned, a large proportion of institutions are able to meet their ordinary requirements from their own farms.

Bread.—This issue to patients is for the most part made from pure white wheaten flour, deprived of embryo and all offal. Only about 5 per cent. of mental hospitals purchase whole-meal flour as a matter of routine. Although in a very few instances bread made from whole-meal flour is issued to patients weekly, or even (in one or two cases) twice weekly, in the large majority of institutions brown bread is not supplied at all, or only given occasionally at long intervals. When this bread is issued it is usually made from a mixture of about 60 per cent. whole meal and 40 per cent. white flour.

The breakfast ration of bread varies materially in different institutions, the average allowance ranging from 6 to 7 ozs. for males, and from 5 to 6 ozs. for females. At one hospital 9 ozs. is provided for men, and at another 2 ozs. only for women. In the latter case porridge is also supplied, as is also the case in some other institutions giving comparatively small quantities of bread.

The allowances in detail are as follows:—

Bread Allowance.	No. of Mental Hospitals.		Bread Allowance.	No. of Mental Hospitals.	
	Males.	Females.		Males.	Females.
<i>Ad lib</i>	8	8	5 ozs.	5	31
9 ozs.	1	—	4 "	2	—
8 $\frac{1}{2}$ "	1	—	3 $\frac{3}{4}$ "	1	—
8 "	29	4	3 $\frac{1}{2}$ "	1	4
7 "	18	5	3 "	—	1
6 $\frac{1}{2}$ "	—	1	2 $\frac{1}{2}$ "	—	1
6 "	30	37	2 "	—	1
5 $\frac{1}{2}$ "	—	2			
				95	95

Excluding the *ad lib.* allowance, the actual amount of which is difficult to estimate, the average of the remaining figures works out at 7 ozs. for males and 5·2 ozs. for females,

Cake (more properly described as currant loaf) is supplied at two hospitals twice weekly in lieu of bread and margarine, and at one institution four times each week.

Margarine is provided in 94 hospitals, and butter in one. It has been suggested that in one or two institutions a mixture of margarine and butter has occasionally been issued to patients; but the dietary scales supplied to the Committee provided no evidence that this is done anywhere with any approach to regularity. The margarines in general use, listed at from 45s. to 50s. per cwt., are made almost entirely from vegetable fats. Oleo-margarine, at prices varying from 86s. to 82s. per cwt., is given regularly at three mental hospitals, otherwise its issue is a matter of rare occurrence, owing mainly to its price, and (as some

maintain) its scarcity. The ration of margarine for each patient varies between $\frac{1}{5}$ oz. to $\frac{3}{4}$ oz., the average being about $\frac{1}{2}$ oz. for each meal.

Porridge is supplied for breakfast as follows :—

Number of times weekly	...	0	1	2	3	4	5	6	7
Number of hospitals	...	42	3	9	14	7	4	1	15

Bacon is mentioned as included in the breakfast scale of 18 hospitals, being given daily at one institution, at another three times weekly, at four others twice, at 11 once, and in the remaining instance fortnightly.

Sausage, luncheon sausage, or saveloy.—One or other of these dishes appear on the breakfast scales of 17 hospitals, being allowed twice weekly at one, and once weekly at 16.

Preserved meat, brawn, cold salt beef, boiled beef, or galantine is given twice weekly at five institutions, and once weekly at 17.

Fish, fish paste, or potato and fish pie forms part of the breakfast meal once weekly in 14 instances.

Cheese and macaroni cheese are given, respectively, twice weekly in one case, and once weekly in another.

Jam, marmalade or syrup is available for patients for breakfast four times weekly at one hospital, three times at two institutions, twice at five, and once at six.

Other variations.—At one hospital eggs may be given in place of bacon, and at another there is an occasional issue of fresh herrings. In six instances it is stipulated that “dripping when available” may be issued in lieu of margarine, and in a few instances jam is also regarded as a substitute for the latter. At one hospital no margarine is issued when meat is served, so that dry bread only is available.

The allowance of meat, sausage, etc., appears to be from $1\frac{1}{2}$ to 2 ozs. per patient. It should be recorded, however, that at one hospital the ration of *uncooked* bacon is 1 oz. only, and at another the quantity of cooked meat only 1 oz. 1 oz. of jam, marmalade or syrup is the amount of these commodities usually given.

Table I (page 72) shows the position in concrete form, so far as the issue of the most important articles of breakfast diet are concerned.

TEA MEALS.

These usually consist of tea, bread and margarine, or (in one case) butter, with an occasional issue of cake, jam, marmalade or treacle, in addition to (or in substitution for) part or all of the bread or margarine. In a few instances porridge is a regular issue for tea.

The supply of milk for tea for ordinary non-working patients varies from $\frac{1}{16}$ pint to $\frac{1}{2}$ pint per head, with an average allowance of about $\frac{1}{7}$ pint.

Beverages.—(Tea, coffee or cocoa.)

At 83 hospitals one beverage only is issued, viz., tea.

At eight hospitals a choice of two beverages is provided for, and

At four hospitals a choice of three.

The remarks made above, concerning variation in the quantities of ingredients used for the making of breakfast beverages, apply equally here.

Bread.—The allowances of this article of diet for tea differ from the amounts issued for the breakfast meal.

Bread Allowance.	No. of Mental Hospitals.		Bread Allowance.	No. of Mental Hospitals.	
	Males.	Females.		Males.	Females.
<i>Ad lib.</i> ...	8	8	$5\frac{1}{2}$ ozs. ...	1	2
10 ozs. ...	1	—	5 „ ...	14	17
$8\frac{1}{2}$ „ ...	2	—	$4\frac{1}{2}$ „ ...	—	1
8 „ ...	32	4	4 „ ...	—	11
$7\frac{1}{2}$ „ ...	—	1	$3\frac{3}{4}$ „ ...	—	1
7 „ ...	20	8			
$6\frac{1}{2}$ „ ...	—	2			
6 „ ...	17	40	Total ...	95	95

Again excluding the *ad lib.* allowance the average issue works out at 6·9 ozs. for men and 4·9 ozs. for women. Material differences in the known amounts provided are evident, varying as they do from a maximum in the case of men and women of 10 ozs. and 8 ozs., to a minimum of 5 and $3\frac{3}{4}$ ozs., respectively.

Porridge is given seven times weekly for tea at three hospitals.

Cake (or currant loaf) is served in lieu of bread and margarine each week, as follows :—

Number of times	...	...	...	...	1	2	4
Number of hospitals	...	...	...	...	22	9	2
(Half bread and margarine and half cake is given in three of these institutions.)							

Cake is given in addition to bread and margarine as follows :—

Number of times each week	...	...	1	2	3	7
Number of hospitals	...	...	17	8	2	7

At 23 institutions cake is not supplied at all, and in regard to five others no information is available.

Margarine is provided for tea at 94 institutions, and butter regularly at one, the quantities issued, as in the case of the breakfast meal, varying from $\frac{1}{8}$ to $\frac{3}{4}$ oz., with an average allowance of about $\frac{1}{2}$ oz. for each meal.

Jam, marmalade, treacle or honey forms part of the tea ration :—

Once weekly at 30 hospitals.

Twice	„	9	„
3 times	„	7	„
4	„	4	„
5	„	6	„
7	„	3	„

—
59
—

At 36 hospitals no jam, marmalade or honey is supplied throughout the year.

Cheese is given for tea :—

Once weekly at 7 hospitals.

Twice	„	5	„
3 times	„	1	hospital.
5	„	1	„

—
14
—

Meat or fish paste :—

Once weekly at 2 hospitals.

Twice	„	1	hospital.
3 times	„	1	„
4	„	1	„

—
5
—

Dried fish is given once weekly at one hospital.

Potatoes (presumably baked) once weekly at one hospital.

Meat is provided three times weekly at one hospital, and twice weekly at another.

Fish cake, once weekly at one hospital.

Occasional issues—

Fruit and salad—

“ When in season ”	...	...	...	...	6	hospitals.
“ When grown on site ” (in lieu of margarine)	...	1	„			
“ When available from garden ”	...	4	„			
“ Salad at the discretion of the Medical Superintendent ”	...	1	„			

Dripping, in lieu of margarine	5 hospitals.
„ in addition to margarine	1 „
“ Butter, in lieu of margarine, occasionally ” ...	2 „
“ Eggs, when plentiful ”	1 „
“ Jam when in stock ”	1 „

At one hospital the extras include jam (twice), cheese (twice), and fish paste twice weekly ; these weekly extras to be divided between the breakfast and tea meal.

At a number of institutions, as an extra, or in lieu of bread and margarine, either jam, marmalade, honey, treacle, or cake is issued once weekly—in general, on Sunday.

Table II (page 73) shows some of the above details in concrete form, so far at least as the most important tea foods are concerned.

DINNERS.

The following details relating to the chief (mid-day) meal of the day are separately considered under three heads—particulars concerning (a) the main article of food, such as meat or fish ; (b) foods accessory to the main dish—bread, potatoes, vegetables, etc. ; and (c) puddings.

(a) *The Main Article of Food.*

In 81·1 per cent. of all mid-day meals provided (in 95 mental hospitals) throughout the year, fresh meat in some form or other is supplied as the main article of food, and in a further 5·6 per cent. the meat is preserved (tinned), making a total of 86·7 meat dinners. In 7·3 per cent. of the remaining 13·3 per cent. the main dish consists of fish, thus raising the proportion of meat or fish dinners to 94 per cent. Of the balance (6·0 per cent.), 1·8 consists of vegetable soup or pie, and 4·2 of dishes of varied character, such as “ plum duff,” apple pudding, fruit tart, etc.

Meat in some one or other form is served :—

4 times weekly at 3 hospitals.
5 „ „ 14 „
6 „ „ 49 „
7 „ „ 29 „
—
95
—

The sub-division of the various meat dinners is as follows :—

<i>Roast or boiled meat—</i>							
No. of times served	...	1	2	3	4	5	6
No. of hospitals	...	3	27	37	22	4	2
<i>Meat pie—</i>							
Once weekly at 65 hospitals.							
Twice	„	13	„				
3 times	„	2	„				
<i>Meat pudding—</i>							
Once weekly at 10 hospitals.							
Twice	„	1	„				
<i>Meat stew or “ hot pot ”—</i>							
Once weekly at 62 hospitals.							
Twice	„	13	„				
<i>Minced beef (steamed)—</i>							
Once weekly at 2 hospitals.							
<i>Stewed rabbit—</i>							
Once weekly at 7 hospitals.							
“ Occasionally ” at 14 hospitals.							
<i>Meat soup—</i>							
Once weekly at 29 hospitals.							
Twice	„	8	„				
<i>Preserved meat—</i>							
Once weekly at 31 hospitals.							
Twice	„	3	„				

Fish is provided at 49 hospitals once weekly, steamed or boiled at 42, and regularly fried at seven.

Vegetable soup is given once weekly at 16, and twice weekly at six hospitals.

The allowance of meat or vegetable soup varies from $\frac{3}{4}$ pint to 2 pints per person.

Table III shows in concrete form the number of dinners during one year that contain all the main articles of food.

(b) *Foods accessory to the main dish.*

Bread is supplied (with three exceptions) at all hospitals with the dinner meal, the allowance varying from 1 oz. at one institution to 7 ozs. at another, with an average ration of 2 to 3 ozs. per person.

Potatoes find place in 93·1 per cent. of all dinners provided in hospitals throughout the year, fresh vegetables in 67·2 per cent., and dried vegetables in lieu of potatoes in 6·6 per cent., and in addition to potatoes in 3·4 per cent. It would seem, therefore, that vegetables, either fresh (for the most part) or dried are given in addition to potatoes in about 70·6 per cent. of all dinners.

Potatoes form part of the dinner—

3 times weekly at 2 hospitals.

5	„	„	10	„
6	„	„	16	„
7	„	„	67	„

—
95
—

Fresh vegetables are given—

Twice weekly at 7 hospitals.

3 times	„	11	„
4	„	18	„
5	„	15	„
6	„	9	„
7	„	20	„

“When avail-

able ” ... 5 „

Insufficient de-

tails ... 10 „

} Estimated average supply,
4 times weekly.

—
95
—

Dried vegetables, haricot beans, peas, etc., are supplied—

Once weekly at 7 hospitals.

Twice	„	19	„
3 times	„	6	„
4	„	1	„

—
33
—

(c) *Puddings.*

Puddings are given in 36·5 per cent. of all dinners served throughout the year, and cheese in lieu of pudding in 3·4 per cent. A second course is provided, therefore, in 39·9 per cent. only of all the mid-day meals in mental hospitals.

Of the 36·5 per cent. of puddings, 17·7 per cent. are of kinds in which suet is used, 16·5 per cent. are milk puddings, 1·8 per cent. are bread puddings, and 0·5 per cent. stewed fruit with rice.

Puddings are served—

Once every fortnight at 1 hospital.	
Once weekly at	18 hospitals.
Twice „	23 „
3 times „	12 „
4 „ „	4 „
5 „ „	4 „
6 „ „	5 „
7 „ „	11 „
No puddings given at	17 „
<hr/>	
95	
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*Puddings are served as follows :—**Milk pudding—*

Once weekly at 17 hospitals.	
Twice „	7 „
3 times „	11 „
4 „ „	6 „
5 „ „	2 „
6 „ „	2 „
<hr/>	
45	
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Bread pudding—

Once weekly at 8 hospitals.	
Twice „	2 „
<hr/>	
10	
<hr/>	

Plain suet pudding—

Once weekly at 28 hospitals.	
Twice „	6 „
3 times „	1 „
<hr/>	
35	
<hr/>	

Dried fruit pudding—

Once weekly at 34 hospitals.	
Twice „	3 „
3 times „	4 „
4 „ „	3 „
<hr/>	
44	
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*Ginger pudding.—Once weekly at 2 hospitals.**Fresh fruit pudding—*

Once weekly at 6 hospitals.	
Twice „	1 hospital.
<hr/>	
7	
<hr/>	

*Flour dumpling.—Once weekly at 1 hospital.**Rhubarb and rice.—Once weekly at 3 hospitals.*

Other variations and additions.—Cheese is supplied in lieu of pudding once weekly at 16 hospitals, twice weekly at two, and three times weekly at one hospital. There is a note in the dietary scales of six institutions providing for the issue of “salad when in season and available.” Ten institutions make provision for the issue of fruit pies in place of other puddings when fresh fruit is available, and one for “the supply of oranges and apples occasionally as dessert.” In one institution “pea-nuts *ad lib.*” appears on the diet scale.

Table IV shows in concrete form many of the above details concerning accessory articles of dinner food.

TABLE I.—*Analysis of Breakfast Meals.*

No. of Mental Hospitals.	Total No. of breakfasts provided each year.	Bread and margarine only supplied.	Bread and margarine with porridge.	Breakfasts composed of bread, with or without margarine, and—					
				Bacon.	Sausage, luncheon sausage or saveloy.	Preserved meat, brawn, salt or boiled beef, galantine or potted meat.	Cheese or macaroni cheese.	Fish, fish paste, or potato and fish pie.	Jam, marmalade or syrup.
95	34,675	16,813	11,544	1,534	936	1,612	156	728	1,352
Totals	...	28,357				6,318			
Percentages of total break- fasts	...	48.5	33.3	4.4	2.7	4.6	0.5	2.1	3.9
	...	81.8.				14.3			3.9

TABLE II.—*Analysis of Tea Meals.*

No. of Mental Hospitals.	Total No. of tea meals provided each year.	Bread and margarine only supplied.	Currant loaf in lieu of part or all bread and margarine.	Porridge in lieu of part or all bread and margarine.	In addition to or in lieu of margarine.			In addition to or in lieu of bread and margarine.			
					Pastes, meat or fish.	Jam, marma- lade, treacle or honey.	Cheese.	Cake.	Dried fish or fish cake.	Meat.	Potatoes.
95	34,675	17,151	2,496	1,092	572	7,072	1,310	4,576	104	260	52
Totals	...	20,739				8,944			4,992		
Percentages of total tea meals ...	...	49.5	7.2	3.1	1.7	20.4	3.7	13.2	0.3	0.7	0.2
			56.7	3.1							
			59.8				25.8				14.4

TABLE III (DINNERS)---Details concerning the main article of food.

No. of Mental Hospitals.	Total No. of dinners served yearly.	Fresh meat, or food prepared from fresh meat.						Preserved (tinned) meat.	Fish.		Vegetable soup or pie.	Various, or not clearly stated.
		Roast or boiled meat.	Meat stew or hot pot.	Meat pudding or meat pie.	Minced beef (steamed).	Meat soup.	Stewed rabbit.		Steamed or boiled.	Fried.		
95	34,675	14,976	4,576	5,668	104	2,340	472	1,924	2,184	364	1,456	611
Totals	...	28,136						1,924	2,548	1,456		611
Percentages	...	{ 43.2	13.2	16.3	0.3	6.7	1.4	5.6	6.3	1.0	4.2	1.8
			81.1						7.3			

TABLE IV (DINNERS)—Details concerning accessory articles of food.

No. of Mental Hos- pitals.	Total No. of dinners served yearly.	Vegetables.				Puddings.							Cheese in lieu of puddings		
		Po- tatoes.	Fresh vege- tables.	Dried vegetables.		Milk pudding	Bread pudding	Puddings in which suet is used.				Rhubarb and rice.			
				In lieu of po- tatoes.	With po- tatoes.			Plain suet.	Dried fruit.	Ginger.	Fresh fruit.			Flour dump- lings.	
95	34,675	32,292	23,296	2,283	1,201	5,720	624	2,236	3,328	104	416	52	156	1,196	
						3,484		6,136							
Percentages	...	93.1	67.2	6.6	3.4	16.5	1.8	6.5	9.6	0.3	1.2	0.1	0.5	3.4	
				10.0		17.7									
				36.5											

TABLE V.—*Specimen diets of monotonous type (non-workers only).*

In each case the same food is given to both sexes, but the quantities shown are those for males. The amounts, as regards some articles, are smaller for females.

No. 1.

	Breakfast.			Dinner.								Tea.		
	Bread.	Marga- rine.	Cocoa.	Roast meat.	Boiled bacon.	Irish stew.	Com- pressed beef or mut- ton.	Boiled meat.	Fish.	Meat pie.	Po- tatoes and vege- tables.	Bread.	Marga- rine.	Tea.
	Ozs.	Oz.	Pint.	Ozs.	Ozs.	Pint.	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.	Oz.	Pint.
Sunday	8	$\frac{1}{2}$	1	8	—	—	—	—	—	—	14	8	$\frac{1}{2}$	1
Monday	8	$\frac{1}{2}$	1	—	6	—	—	—	—	—	14	8	$\frac{1}{2}$	1
Tuesday	8	$\frac{1}{2}$	1	—	—	1	—	—	—	—	14	8	$\frac{1}{2}$	1
Wednesday	8	$\frac{1}{2}$	1	—	—	—	5	—	—	—	14	8	$\frac{1}{2}$	1
Thursday	8	$\frac{1}{2}$	1	—	—	—	—	8	—	—	14	8	$\frac{1}{2}$	1
Friday	8	$\frac{1}{2}$	1	—	—	—	—	—	12	—	14	8	$\frac{1}{2}$	1
Saturday	8	$\frac{1}{2}$	1	—	—	—	—	—	—	8	14	8	$\frac{1}{2}$	1

The quantities of meat in all cases are uncooked with bone.
Bread puddings are given for dinner, and jam, marmalade or cake for tea on Sundays.
Half a pint of milk or lemonade is given with dinner each day.

TABLE V—continued.

No. 2.

	Breakfast.			Dinner.											Tea.				
	Bread.	Margarine.	Tea.	Bread.	Uncooked meat with bone.	Uncooked potatoes.	Uncooked vegetables.	Meat, 4 ozs. (uncooked).				Corned beef.	Pudding.	Cheese.	Pickles.	Bread.	Currant loaf.	Margarine.	Tea.
								Meat pie.	Stew.	Soup.	Hot pot.								
Sunday	8	$\frac{1}{2}$	1	3	7	9	6	Ozs.	Ozs.	Ozs.	Ozs.	Pint.	Ozs.	Ozs.	Oz.	Oz.	4	$\frac{1}{4}$	1
Monday	8	$\frac{1}{2}$	1	—	—	—	4	16	—	—	—	—	—	—	—	—	8	$\frac{1}{2}$	1
Tuesday	8	$\frac{1}{2}$	1	3	—	—	—	—	20	—	—	—	—	—	—	—	8	$\frac{1}{2}$	1
Wednesday	8	$\frac{1}{2}$	1	3	—	9	—	—	—	—	—	1	—	—	—	—	8	$\frac{1}{2}$	1
Thursday	8	$\frac{1}{2}$	1	3	—	—	4	—	—	—	16	—	—	—	—	—	8	$\frac{1}{2}$	1
Friday	8	$\frac{1}{2}$	1	2	—	12	4	—	—	—	—	—	—	—	1	8	8	$\frac{1}{2}$	1
Saturday	8	$\frac{1}{2}$	1	3	—	—	—	—	—	—	—	1	—	—	—	8	8	$\frac{1}{2}$	1

TABLE V—continued.

No. 3.

	Breakfast.			Dinner.								Tea.			
	Bread.	Mar- garine.	Coffec.	Pre- served meat.	Meat pies.	Boiled beef.	Soup.	Pre- served meat.	Boiled beef.	Stew.	Po- tatoes and vege- tables.	Bread.	Bread.	Mar- garine.	Tea.
Sunday ...	Ozs. 6	Oz. $\frac{1}{2}$	Pint. 1	Ozs. 5	Ozs. —	Ozs. —	Ozs. —	Ozs. —	Ozs. —	Ozs. —	Ozs. 8	Ozs. 5	Ozs. 6	Oz. $\frac{1}{2}$	Pint. 1
Monday ...	6	$\frac{1}{2}$	1	—	16	—	—	—	—	—	—	—	6	$\frac{1}{2}$	1
Tuesday ...	6	$\frac{1}{2}$	1	—	—	7	—	—	—	—	8	5	6	$\frac{1}{2}$	1
Wednesday...	6	$\frac{1}{2}$	1	—	—	—	20	—	—	—	—	5	6	$\frac{1}{2}$	1
Thursday ...	6	$\frac{1}{2}$	1	—	—	—	—	5	—	—	8	5	6	$\frac{1}{2}$	1
Friday ...	6	$\frac{1}{2}$	1	—	—	—	—	—	7	—	8	5	6	$\frac{1}{2}$	1
Saturday ...	6	$\frac{1}{2}$	1	—	—	—	—	—	—	20	—	5	6	$\frac{1}{2}$	1

APPENDIX B.

ANTHROPOMETRIC DATA CONCERNING THE INSANE.

By Major GREENWOOD, F.R.C.P.Lond., M.R.C.S.

Stature.

Very satisfactory material for a comparison between the stature of male patients in mental hospitals and that of other classes of the population exists. Tocher's careful study of the inmates of Scottish mental hospitals is also available for reference.

In Table IB we have set out details of the means in stature obtained by various investigators, including Goring and Tocher—the former's biometric analysis of criminological data is one of the classics of anthropometry.*

Comparing our results (IA) with those of Tocher† for the Scottish insane population, it is seen that the agreement is very close. Tocher distinguishes a "General Insane" from an "Entire Insane" population, the former derived from the latter by exclusion of individuals "considered by their medical attendants to have characters affected by special causes, not characteristic of insanity in general" (Tocher, p. 301).

Since we have excluded no data, our samples presumably approximate more closely to the "Entire Insane" of Tocher's classification. It appears that our males are very slightly shorter and our females slightly taller than those of the Scottish hospitals.

Tocher inquired whether the differences between the means of the 22 mental hospitals furnishing data were consistent with random sampling, and concluded that the answer was "no," that the local insane populations were differentiated. A similar analysis of our material leads to the same conclusion. The range of height is from just over 66 inches (males) to 64·25, and from 64 to 59·9 in females (see Table II).

The mean stature of convicts is the same as that of our male patients, their range (see Goring, p. 195) similar to that of the hospitals. The explanation proposed by Goring to account for the inferiority of the convict population in this matter of stature, viz., that criminals—in particular convicted criminals—represented a selection, an unfavourable selection, of the population (see Goring, *op. cit.*, 196, etc.), may be applied with even greater plausibility to the case of patients in mental hospitals, and we have very little doubt that, so far as stature is concerned, our sampling inquiry has furnished a true picture of the characters of a mental hospital population, and almost as little doubt that this population is a physical select group, the males of which are shorter than the average of their social class. But this difference may be very small. There is (see Table IB) a wide range of stature in the normal population, and it is probable—although not certain—that the general population from which the patients in public mental hospitals are drawn approximates in character more closely to the artisan class of Roberts' survey than to any other group. It is probable, therefore, that the actual defect is small.

Although not very relevant to the main purpose of this investigation, the point just made has this importance—that it supports the conclusion long held that a mental hospital population is, on the average, *organically* differentiated from a general population.

Table III compares the correlations between height and age in healthy and insane. The difference is insignificant, and calls for no comment.

* *The English Convict, a Statistical Study*, by Charles Goring, M.D. London, 1913 (H.M. Stationery Office).

† Tocher, J. F. The Anthropometric Characteristics of the Inmates of Asylums in Scotland, *Biometrika* V, 1906-07, pp. 298-350.

Weight.

The literature of weight in normal populations is very much more scanty than the literature of stature; the weight of adult women has, indeed, hardly been discussed at all in England and Wales. Further, a majority of the results regard the weight of *clothed* persons, and there is a great diversity between the actual (or estimated) weights of clothing (in our own inquiries at mental hospitals there is a range of from 7 to 14 lbs. in the estimates of weight of male clothing). The best data we have are the measurements of Air Force Candidates, 1,238 in number, all weighed accurately, the subjects stripped. The mean was 139·86 lbs. Next come Goring's 2,500 convicts' weight in shirt and trousers only. Here the mean was 142·56 lbs. The convicts were, however, older and shorter men than the Air Force candidates, more than 12 years older and more than 3 inches shorter, on the average. Using the regression equation connecting age, height, and weight, obtained from the Air Force data, we estimate that the average weight of a male at the age and of the mean stature of the convicts would be 136·7 lbs. This is the estimated stripped weight, assuming that the shirt and trousers weighed 2 to 3 lbs., we reach 139 to 140 lbs. as the figure to be compared with the actually observed weight of 142·56 lbs. The agreement is reasonable, and it does not appear that convicts are, *for their height*, under weight.

The remainder of the data relate to clothed men. The 3,000 measurements recorded by Hutchinson 80 years ago give a mean of 147·86 lbs. The 5,032 men, aged from 25 upwards, reported on by the Committee of the British Association 40 years ago, have an average of 159·2 lbs. Lastly, Schuster's statistics of undergraduates (weighed without boots or coat) give a mean of 151·94 lbs. Hutchinson's subjects included persons between the ages of 15 and 40. All but 59 of Schuster's subjects were between 18 and 23, so that we should expect the mean weights to be less than those of the British Association's sample. The data of the Medico-Actuarial Association of America refer to 221,694 men having a mean age of 33 years, and a mean stature of 68·5 inches. The mean weight is 156·2 lbs. This is the weight of the clothed man.

Owing to the difficulty about clothing, we are really not in a position to state precisely what the average weight of a normal population is. The average age of the males over 25 in the British Association's experience was 34·9 years, and the average height 67·92 inches. From the analysis of the Air Force data (Cripps, Greenwood and Newbold) the following regression equation of weight upon height and age has been deduced :—

$$\begin{aligned} \text{Weight (in lbs.)} = & \cdot 7326 \times \text{Age (in years)} + 3 \cdot 6133 \times \\ & \text{Height (in inches)} - 126 \cdot 37. \end{aligned}$$

This gives for age 34·9 years and height 67·92 inches, a body weight of 144·6 lbs., 14·6 lbs. less than the observed weight with clothes. It is unlikely that the mean weight of clothing exceeds 12 lbs., so that there is a probability that the average weight of the general population 40 years ago was rather above that of the section which provides the Air Force candidates. As, however, the regression of weight upon age is not linear, the estimate is only a rough approximation. Recent data of Assurance Companies* agree better with the Air Force experience. We shall probably be justified in assuming that the standard set by the Air Force data is not pitched too high.

We have not been able to form a very high opinion of the accuracy of the records of weight maintained in the mental hospitals, and only six of the institutions furnishing us with returns have made weighings in a manner such that the results are fairly comparable with those of the Air Force. A full analysis of these returns is set out in Table IV and in Table V, we compare the observed weights with those predicted from the Air Force experience, making allowance for differences of height and age; in five there is a deficit, in three a large deficit.†

* *Journ. Inst. Actuaries*, LIV, 1923, 213.

† Data for healthy women are so scanty that the subject is not discussed here; it will be discussed in another paper.

In Table VI we show the difference between initial and final weight in all the sampled institutions. Although, excepting the six cases dealt with in Table IV, the absolute values are not comparable between institutions, it is probable that the method of weighing in any one institution is constant, so that the *differences* between initial and final weights are comparable.

From Table IV it clearly follows that there is no relation between *scheduled* diet and body weight in the mental hospitals under study. From the remaining tables we infer (1) that the mean weights of males in mental hospitals are below the average of a normal population of the same age and height as the insane ; (2) that about 30 per cent. of the insane population lose weight between admission and date of observation, which is from 12 to 18 months after admission. These results cannot be explained by the existence in the mental hospital population (between date of admission and date of observation) of a supra-normal proportion of persons suffering from bodily disease, such as phthisis, notoriously associated with loss of weight. Giving a very liberal interpretation to the term physical disease likely to lead to loss of weight, we find that the proportion of patients in our sample belonging to this class is less than 5 per cent., and simple calculation shows that dilution of normal material with 5 per cent. of persons even enormously under weight would not bring down the general average so low as it is found to be. Another possible explanation is that many victims of the acute psychoses are known to lose weight rapidly, and that a sample observed so short a time from admission as 15 months will include a relatively large proportion of these acute cases. But against this must be set the fact that the circumstances of the insane amongst the poorer classes are often very unfavourable, so that the state on admission is often very bad. Qualitatively these two considerations tend in opposite directions, and our data are neither numerous enough nor accurate enough to allow us to measure their quantitative importance.

We are forced to conclude that this subject of the change in weight of patients in mental hospitals requires much further investigation. A more detailed report on the findings of the present inquiry will subsequently be prepared, but this fuller report will only bring out more clearly certain points of statistical interest. We do not think it is practicable on the basis of the present experience to reach any more distinct conclusions on the main issue than have been expressed above. We are not satisfied with the results because, in our opinion, this branch of study is one which, in mental hospitals, ought to have been carried further than appears to have been the case.

TABLE IA.—*Mean Heights, with Probable Errors and Standard Deviations.*

Mental Hospital.	Males.			Females.		
	No. of ob- ser- va- tions.	Mean height.	Stand- ard Devia- tion.	No. of ob- ser- va- tions.	Mean height.	Stand- ard Devia- tion.
Brentwood, Essex ...	217	65.52 \pm .133	2.9067	230	61.06 \pm .133	2.9990
Severalls, Essex ...	149	65.35 \pm .183	3.3043	195	61.04 \pm .145	3.0020
Three Counties, Beds.	95	64.53 \pm .222	3.2042	135	59.89 \pm .158	2.7287
Cambridgeshire ...	39	64.25 \pm .519	4.8012	83	61.42 \pm .193	2.6013
Chester County ...	174	65.74 \pm .200	3.9036	215	61.46 \pm .148	3.2180
Devonshire ...	110	65.49 \pm .182	2.8303	152	60.80 \pm .185	3.3662
Kent County ...	156	65.62 \pm .181	3.3536	248	62.10 \pm .126	2.9454
Cheshire ...	146	65.70 \pm .123	2.2106	183	62.27 \pm .143	2.8658
Dorset County ...	61	65.00 \pm .195	2.2542	95	62.06 \pm .233	3.3716
Kent County, Chart- ham	152	66.02 \pm .172	3.1511	132	61.45 \pm .164	2.7892
Bracebridge, Lincs. ...	126	65.37 \pm .179	2.9790	152	61.02 \pm .130	2.3832
Lancaster Moor ...	175	65.91 \pm .144	2.8211	189	60.04 \pm .157	3.1988
Kesteven County, Lincs.	63	64.96 \pm .248	2.9219	60	64.02 \pm .164	1.8830
Prestwich, Lincs. ...	249	65.19 \pm .107	2.5032	231	60.64 \pm .136	3.0577
Morpeth, Northumber- land	133	65.97 \pm .137	2.3370	—	—	—
Colney Hatch ...	244	64.98 \pm .109	2.5183	250	61.15 \pm .142	3.3262
City of Newcastle ...	182	66.27 \pm .148	2.9550	183	61.79 \pm .143	2.8692
All Asylums ...	2,471	65.55 \pm .041	3.0486	2,732	61.27 \pm .040	3.0993

TABLE IB (MALES)—Mean Stature (in inches), and its Probable Error for Professional Classes, Air Force Candidates, Convicts, Insane, and certain occupational classes.

	Various classes in order of mean heights.	Commercial classes, clerks, and shop- keepers.	Selected classes, soldiers, policemen, messengers, servants.	Labourers : agricultural, roads, quarries, railways.	Sailors, fishermen.	Miners, coal and mineral.	Artisans.	Factory operatives.
Schuster's Results (Oxford Undergraduates, "Biometrika," Vol. VIII) ...	69·49 ± 0·057	—	—	—	—	—	—	—
British Association Report, 1881—Popu- lation, ages 25-30 ...	69·14 ± 0·15	67·95 ± 0·12	—	67·51 ± 0·05	—	—	66·61 ± 0·09	65·92 ± 0·11
Macdonell's Cambridge Students. ("Bio- metrika," Vol. V, p. 347)... ..	68·86 ± 0·05	—	—	—	—	—	—	—
Pearson's English Sons ("Biometrika," Vol. V, p. 347)	68·86 ± 0·05	—	—	—	—	—	—	—
Air Force Candidates (Cripps, Greenwood and Newbold, "Biometrika," Vol. XIV, p. 316)	68·83 ± 0·048	—	—	—	—	—	—	—
Air Force Candidates passed Fit (Cripps, Greenwood and Newbold, "Bio- metrika," Vol. XIV, p. 316)	68·82 ± 0·054	—	—	—	—	—	—	—
Roberts' General Population—Ages 23-30	68·66 ± 0·12	—	67·93 ± 0·03	—	—	—	66·43 ± 0·12	—
" " " 23-50	67·93 ± 0·15	67·28 ± 0·10	67·22 ± 0·02	67·10 ± 0·04	66·37 ± 0·09	66·91 ± 0·19	66·77 ± 0·09	66·89 ± 0·14
Galton's South Kensington Lab. Data. "Pearson's Chances of Death," Vol. I, p. 311	67·90 ± 0·06	—	—	—	—	—	—	—
Pearson's English Fathers ("Biometrika," Vol. V, p. 347)	67·74 ± 0·05	—	—	—	—	—	—	—

TABLE IB—MALES—continued.

	Various classes in order of mean heights.	Commercial classes, clerks, and shop- keepers.	Selected classes, soldiers, policemen, messengers, servants.	Labourers : agricultural roads, quarries, railways.	Sailors, fishermen.	Miners, coal and mineral.	Artisans.	Factory operatives.
—								
Tocher's General Insane Population (" Bio- metrika," Vol. V, p. 303)... ..	65.9 ± 0.029	—	—	—	—	—	—	—
Tocher's Entire Insane Population (" Bio- metrika," Vol. V, p. 303)... ..	65.7 ± 0.029	—	—	—	—	—	—	—
English Mental Hospitals data	65.55 ± 0.041	—	—	—	—	—	—	—
Bexley Mental Hospital	65.54 ± 0.062	—	—	—	—	—	—	—
Convicts (Goring)	65.46 ± 0.036	—	—	—	—	—	—	—
Tocher's Roxburgh and Selkirk Volunteers (" Biometrika," Vol. V, p. 347)	—	—	67.89	—	—	—	—	—
Tocher's Aberdeenshire Rural Population (" Biometrika," Vol. V, p. 347)	—	—	—	67.72	—	—	—	—
British Recruits (Report on Health of the Army, 1909)	—	—	66.22 ± 0.01	—	—	—	—	—
British Association Report, 1881. All males over 25	67.92	—	—	—	—	—	—	—

TABLE II.—*Differences of Heights from General Mean.*

	Males.			Females.		
Mental Hospital.	Differ- ence.	Prob- able error of differ- ence.	Ratio of S.D. of sam- pling to differ- ence.	Differ- ence.	Prob- able error of differ- ence.	Ratio of S.D. of sam- pling to differ- ence.
Brentwood	−0.03	0.1396	−0.16	−0.20	0.1378	− 1.05
Severalls, Essex ...	−0.20	0.1685	−0.77	−0.23	0.1497	− 1.11
Three Counties, Beds.	−1.02	0.2110	−3.17	−1.38	0.1799	− 5.89
Cambridgeshire ...	−1.30	0.3293	−2.03	+0.15	0.2294	+ 0.53
Chester County ...	+0.19	0.1559	+0.68	+0.20	0.1426	+ 0.95
Devonshire	−0.06	0.1961	−0.23	−0.47	0.1701	− 1.77
Kent County... ..	+0.07	0.1646	+0.27	+0.83	0.1327	+ 4.63
Cheshire	+0.15	0.1702	+0.82	+1.00	0.1545	+ 4.85
Dorset County ...	−0.55	0.2633	−1.91	+0.79	0.2145	+ 2.33
Kent County, Chart- ham	+0.47	0.1688	+1.90	+0.18	0.1820	+ 0.76
Bracebridge, Lincs. ...	−0.18	0.1832	−0.70	−0.25	0.1696	− 1.30
Lancaster Moor ...	+0.36	0.1555	+1.74	−1.22	0.1521	− 5.45
Kesteven County, Lincs.	−0.59	0.2591	−1.62	+2.75	0.2699	+11.23
Prestwich, Lancs. ...	−0.36	0.1303	−2.33	−0.63	0.1375	− 3.27
Morpeth, Northum- berland	+0.42	0.1783	+2.09	—	—	—
Colney Hatch ...	−0.57	0.1317	−3.63	−0.12	0.1322	− 0.60
City of Newcastle ...	+0.72	0.1525	+3.41	+0.52	0.1545	+ 2.52

	Males.			Females.		
Probable Error.	Observed.	Theoreti- cal.	Probable Error.	Observed.	Theoreti- cal.	
±1	7	8.5	±1	4	8.0	
±1−2	4	5.5	±1−2	4	5.2	
±2−	6	2.9	±2−3	2	2.1	
			±3−	6	0.7	
Total ...	17	—	Total ...	16	—	
	P. = 0.136.			P. = 0.040.		

TABLE III.—Correlation Co-efficients and Ratios of Age and Height for Air Force and Mental Hospitals.

—	No. of observations.	Mean age.	Standard deviations.	Mean height.	Standard deviation.	Correlation co-efficient.	Correlation ratio height on age.
Air Force Candidates—Males	1,238	Years. 23.92 ± 0.097	5.07	Inches. 68.83 ± 0.048	2.50	—0.0339 ± 0.019	.1790 ± 0.019
English Mental Hospital—Males	2,471	41.94 ± 0.209	15.41	65.55 ± 0.041	3.05	+0.0092 ± 0.014	.2298 ± 0.013
“ “ Females	2,732	43.68 ± 0.199	15.42	61.27 ± 0.040	3.10	—0.0777 ± 0.013	.2654 ± 0.012

TABLE IV.—Comparison of Weights on Admission and at time of Enquiry in six Mental Hospitals where weights were made without clothes.

Mental Hospital.	No. of observations.	1st weight (lbs.).		2nd weight (lbs.).		Difference, 1st and 2nd weight.	Percentages.		Length of residence.	Age.	Calories (from dietaries).	Correlations of height and weight.
		Mean.	Standard deviation.	Mean.	Standard deviation.		Gained.	Lost.				
Three Counties, Beds.	M.	118.62 ± 1.66	24.0461	130.41 ± 1.62	23.3897	11.79	83	16	Months. 12.20	Years. 43.24	2,239	+0.6251 ± 0.042
	F.	107.32 ± 1.15	19.8689	109.99 ± 1.14	19.6951	2.67	60	36	11.13	43.98	1,902	+0.4152 ± 0.048
Cheshire	M.	133.20 ± 1.06	19.0470	138.81 ± 1.23	22.1062	5.61	70	26	12.21	41.73	2,926	+0.5741 ± 0.037
	F.	115.52 ± 1.05	21.0854	119.62 ± 1.09	21.9167	4.10	58	30	10.72	47.28	2,582	+0.3730 ± 0.043
Bracebridge, Lincs....	M.	133.27 ± 1.33	22.0666	136.12 ± 1.33	22.1026	2.85	59	39	12.02	43.20	3,144	+0.5119 ± 0.044
	F.	112.29 ± 1.27	23.2126	112.26 ± 1.23	22.4958	0.03	53	45	12.39	44.25	2,796	+0.1994 ± 0.053
Prestwich, Lanes. ...	M.	132.00 ± 0.72	16.8849	140.67 ± 0.82	19.1491	8.67	74	24	18.58	40.70	2,249	+0.4839 ± 0.033
	F.	107.46 ± 0.96	21.5482	115.38 ± 1.00	20.4674	7.92	72	26	16.22	39.59	2,006	+0.2544 ± 0.042
Colney Hatch	M.	124.55 ± 0.83	19.2852	132.79 ± 0.82	19.0869	8.24	76	21	13.68	38.82	2,844	+0.4630 ± 0.034
	F.	109.77 ± 0.92	21.5319	118.37 ± 0.94	22.0620	8.60	70	27	17.28	41.50	2,565	+0.3206 ± 0.038
City of Newcastle ...	M.	121.05 ± 0.92	18.4000	125.47 ± 0.94	18.7925	4.42	62	34	12.83	43.03	2,553	+0.6173 ± 0.031
	F.	104.92 ± 0.87	17.4079	108.04 ± 0.97	19.3831	3.12	67	29	13.90	41.67	2,218	+0.2994 ± 0.045
Six Mental Hospitals (Weighted Averages)	M.	127.44 ± 0.40	19.2940	134.43 ± 0.44	20.9497	6.99	71	26	14.16	41.34	2,644	+0.4991 ± 0.016
	F.	109.49 ± 0.42	20.8250	114.47 ± 0.43	21.4720	4.98	65	31	14.07	42.74	2,350	+0.3099 ± 0.018

Males.

TABLE V.—*Means of Final Weights (Males) in Table IV, compared with estimates from the Equation—*

$\text{Weight (lbs.)} = 0.7326 \times \text{age (years)} + 3.6133 \times \text{height (inches)} - 126.37$

	Observed weight.	Predicted weight.	Differ- ence.
Three Counties, Beds.	130.5 ±1.62	138.3 ±0.88	+ 7.8
Cheshire	138.8 ±1.23	141.6 ±0.33	+ 2.8
Bracebridge, Lincs.	136.1 ±1.33	141.6 ±0.36	+ 5.5
Prestwich, Lanes... ..	140.7 ±0.82	139.0 ±0.26	− 1.7
Colney Hatch	132.8 ±0.82	136.9 ±0.26	+ 4.1
City of Newcastle	125.5 ±0.94	144.7 ±0.30	+19.2
Whole sample	134.4 ±0.42	140.7 ±0.13	+ 6.3

TABLE VI.

	No. of observa- tions.	Mean age.	Mean period of observation.	Mean gain of weight.	Percentage of patients observed who lost weight while under observation.
Brentwood, Essex
Severalls, Essex
Three Counties, Beds.
Cambridgeshire
Chester County
Devonshire
Kent County
Cheshire
Dorset County
Chartham, Kent County
Bracebridge, Lincs.

Years.	Months.	Lbs.
41.7	12.3	30.4
42.9	15.1	5.49
42.1	13.7	9.10
43.2	13.9	7.28
43.2	12.2	22.1
44.0	11.1	24.1
48.2	13.3	15.8
48.5	12.3	11.15
42.1	11.8	2.70
46.3	11.2	36.3
42.3	12.2	17.9
45.8	10.5	26.5
41.4	11.6	20.7
44.8	13.9	38.6
41.7	12.2	15.9
47.3	10.7	4.23
42.5	10.2	5.40
44.9	11.7	3.27
40.4	11.7	—0.60
44.3	13.1	3.66
43.2	12.0	4.10
44.3	12.4	4.52
		7.00
		3.59
		6.10
		3.39
		—0.20
		45.4

TABLE VI.—*continued.*

		No. of observa- tions.	Mean age.	Mean period of observation.	Mean gain of weight.	Percentage of patients observed who lost weight while under observation.
Lancaster	... .. M.	175	Years. 43.5	Months. 13.9	Lbs. 4.27	28.0
	... .. F.	189	41.7	16.3	6.50	26.5
Kesteven, Lincs.	... .. M.	63	47.0	19.3	2.48	33.3
	... .. F.	60	45.3	13.9	4.90	28.3
Prestwich, Lancs.	... .. M.	249	40.7	18.6	8.21	23.7
	... .. F.	231	39.6	16.2	7.40	25.5
Morpeth, North, Northumberland	M. F.	133	43.4	14.5	4.31	31.6
	... .. M.	—	—	—	—	—
Colney Hatch...	... .. M.	244	38.8	13.7	7.95	21.3
	... .. F.	250	41.5	17.3	5.40	27.2
City of Newcastle	... .. M.	182	43.0	12.8	3.97	33.5
	... .. F.	183	41.7	13.9	3.60	29.0
		Total ob- servations				
		2,471	42.0	13.4	5.60	27.2
Weighted Averages	... .. M.	2,732	43.7	13.7	4.90	30.3
	... .. F.					

APPENDIX C.

A REPORT ON THE RATE OF BASAL METABOLISM IN THE INSANE.

By C. GERALD AINSWORTH, M.B.

In reaching even a rough quantitative estimate of the food requirements of a population it is essential to gather information under three headings. In the first place, we have to determine the *basal* metabolism of the subjects—that is to say, the minimum energy needs of the body under the most favourable conditions, the subject of experiment being at rest, exposed to room temperature, and observed sufficiently long after a meal for the processes of digestion not to be a disturbing factor. In the second place, we must assess the extra demands made by the ordinary activities of life other than those of definite physical work. In the third place we have to allow for the conversion of energy into definite external work. Of these three factors, the first only is capable of really accurate measurement; even when normal persons are under study, the element of conjecture present in estimates of the second and third factors is very large. Naturally, when we are concerned with persons of unsound mind, the difficulties in all cases are much increased. Any experimental work required some degree of intelligent and willing co-operation between observer and observed, a condition most difficult to fulfil in precisely those cases where knowledge is least adequate. In this preliminary report, I deal wholly with some experimental studies of the first factor, the rate of basal metabolism of a sample of patients in a mental hospital.

Method.—The subjects were in the post-absorptive state, the period of observation being from 30–40 minutes in the morning before breakfast—i.e., after a fast of 14 hours. The technique was that of Haldane and Douglas (*see* Cathcart, “Journ. Roy. Army Med. Corps,” November, 1918).

Results.—Tables I and II contain complete protocols of the results. It has been usual to express the rate of metabolism in terms of the unit of surface of the body, but, as Benedict and Harris (*see* “A Biometric Study of Basal Metabolism in Man,” Carnegie Institute, Washington, 1919) have pointed out, the normal rate of basal metabolism in man can be somewhat more accurately expressed as a function of the three variables—age, body weight, height—and these authors have published tables from which the normal rate of metabolism, given a knowledge of age, body weight and height, can be deduced with fair accuracy. In the table, the column headed “expected” records the basal metabolism—in terms of calories per 24 hours—given by Benedict and Harris’s tables for persons of the age, weight and height of my subjects.

The first question to be answered is whether the two samples, as wholes, might reasonably have been expected to arise by chance in sampling a normal population. I take first the sample of women. It will be seen that of the 39 eight only gave values less than the predicted value, and that the average of the observed values is some 14 per cent. greater than that of the predicted values. The square root of the mean square deviation of observed from predicted values is 282·0 calories, and this should be approximately equal to the standard deviation of the predicted values. Now the standard deviation of the predicted values, according to Harris and Benedict’s equations, is 106·35 calories; the constant is based upon 103 observations. What is the probability that a random sample of 39 would deviate so widely from the “truth” in respect of standard deviation?

I discuss this under two hypotheses. The first is that 106·35 really is the correct value. In that case we should expect the sample to have a standard deviation of 103·58 calories with a probable error of 8·10 calories (*see* “Biometrika,” Vol. X, p. 529). But the observed value is 282·0 calories, so the difference is more than 20 times the probable difference, and therefore immensely unlikely as a result of sampling.

The second hypothesis is to suppose that Harris and Benedict’s value *underestimates* the true standard deviation. We can hardly suppose, however, that the “true” value exceeds Harris and Benedict’s result by more than thrice the latter’s approximate probable error (based on the number of observations, 103). This probable error is 4·998 calories. Adding three times this to the 106·35

we reach 121·344 calories. The expected standard deviation for a sample of 39 now becomes 118·19 calories, with approximate probable error of 9·24 calories. Now the ratio of the difference to its probable error is 17·7, still so large that we may be confident we are *not* dealing with a random sample. Hence, also bearing in mind the great excess of positive deviations, we may infer that the rate of basal metabolism in this sample exceeds that of the general female population to a greater extent than chance will readily explain. This series, however, includes persons suffering from different mental diseases, and in different stages of convalescence. Let us now take out the more homogeneous series of 24 subjects of melancholia—viz., Nos. 1, 2, 6 to 13, 20, 21, 23 to 25, 27 to 29, 33, 34, and 36 to 39, inclusive, of the table. This sample (*see* Table III) shows an average excess of 9·5 per cent. over the tabular rate, and a standard deviation of 218·45. Again, taking 121·344 calories as the population value—this is the most favourable assumption we can make—we have as the expected standard deviation of the sample of 24, 117·47 calories, with a probable error of 11·78 calories. The ratio of the difference between 218·45 and 117·47 to the latter's probable error is 8·6—the odds are much more than a thousand to one against this arising as a freak of sampling. Further, 18 of 24 deviations are positive. In the special case of melancholics it still appears probable that the basal metabolism, as determined in these experiments, is above normal, to the extent of perhaps 8 to 10 per cent.

Similar considerations apply to the data of males (*see* Tables II, IV and V). The general inference, therefore, is that the basal metabolism of the insane is somewhat higher than that of normal persons. The conclusion is open to one important criticism, viz., that the subjects may not have remained as completely at rest as the normal persons upon whom Harris and Benedict reached their conclusions. It is well known that a very small amount of muscular exercise will increase the rate of metabolism 5 or 10 per cent. above the basal rate. Whether this is the explanation of the observed excess can only be determined when a longer series of observations has been made. The suggestion of this preliminary note is that in assessing food requirements on the plan laid down by the Food Committee of the Royal Society, the *basal* metabolism of inmates of mental hospitals should be taken as, say, 10 per cent. higher than the figure used for normal persons of the same mean age, height and weight. The consequence of this change can best be seen by noting the effect it would have on the model examples in the Royal Society Committee's Report. In the example on page 6 of that report the basal value would become 78·2 calories, the quota, therefore, for eight hours' sleep, 625·6; for eight hours awake, 813·2 (basal, plus 30 per cent.); for eight hours' work, 625·6, plus 317, or a grand total of 2381·4, instead of 2,194. The re-calculation increases the net energy requirements by only $8\frac{1}{2}$ per cent.—the reason that the increase is less than 10 per cent. is, of course, that no difference has been made in the work quota. It is, however, a matter for consideration whether, if the *primâ facie* result of these experiments be accepted—viz., that the basal rate is higher than normal—the performance of external work by the insane is not also more costly of energy than in the normal subject. The measurement of the cost of work performance in the insane is, however, fraught with such difficulties as to be impracticable without elaborate and costly apparatus.

There appears to be no definite variation in the different types of mental disorder, except that in states of mania the basal metabolic rate appears to be constantly raised. It is obviously impossible to get a person suffering from mania to lie still from 30 to 40 minutes, and breathe quietly into a closed bag. But in all cases in this series of recent or approaching mania the basal metabolic rate has been found to be raised. In the depressed state there is less uniformity; in some eight cases the basal metabolic state is less than normal by more than the 10 per cent. allowed as normal limits, but in at least an equal number it is increased about the same amount. In cases without marked emotional disturbance it is variable, but generally within the normal limits.

I must express my gratitude and indebtedness to Dr. R. Worth, O.B.E., Medical Superintendent of Springfield Mental Hospital, for the help and encouragement which made this investigation possible, and to Dr. M. Greenwood for his invaluable help in setting forth the results and estimating their value.

TABLE I—*Females (All).**Basal Metabolism.*

Mental Disorder.	Age.	Weight.	Height.	Predicted basal metabolism for 24 hours.	Ob- served value.	Differ- ence.
		Kilos.	Cms.			
1. Melancholia ...	44	53·5	157	1,252	1,440	+188
2. „ ...	51	44·0	147	1,109	936	—173
3. Stupor ...	35	42·6	161	1,196	1,296	+100
4. Convalescent from stupor ...	22	51·7	152	1,328	1,584	+256
5. Recovered mel., preg- nant ...	29	68·9	168	1,489	2,064	+575
6. Melancholia ...	39	58·1	161	1,326	1,944	+618
7. „ ...	38	58·1	154	1,318	1,344	+ 26
8. „ ...	45	50·8	163	1,232	1,200	— 32
9. „ ...	51	68·0	165	1,372	1,680	+308
10. „ ...	30	50·8	152	1,282	1,344	+ 62
11. „ ...	51	51·3	157	1,198	1,104	— 94
12. „ ...	42	54·0	146	1,245	1,296	+ 51
13. „ ...	33	61·2	156	1,374	1,680	+306
14. Del. insanity ...	45	50·3	163	1,227	1,488	+261
15. Recovered mania ...	33	58·1	159	1,351	1,944	+593
16. Mania ...	46	73·0	152	1,419	1,752	+333
17. Melancholia (re- covered)	44	47·6	145	1,174	1,008	—166
18. „ „	45	67·1	166	1,394	1,344	— 50
19. Del. insanity ...	45	49·9	159	1,216	1,296	+ 80
20. Melancholia ...	44	53·5	158	1,254	1,448	+194
21. „ ...	51	44·0	147	1,109	1,116	+ 7
22. Recovered melan- cholia, pregnant ...	29	68·9	168	1,489	2,075	+586
23. Melancholia ...	38	58·0	154	1,317	1,333	+ 16
24. „ ...	38	51·3	163	1,270	1,195	— 75
25. „ ...	51	68·0	165	1,372	1,672	+300
26. Dem. prae. ...	30	50·8	152	1,282	1,337	+ 55
27. Melancholia ...	52	51·3	158	1,195	1,308	+113
28. „ ...	42	54·0	145	1,243	1,296	+ 53
29. „ ...	33	61·2	156	1,374	1,672	+298
30. Del. insanity ...	45	50·3	163	1,227	1,498	+271
31. Mania ...	33	58·0	159	1,350	2,023	+673
32. „ ...	43	73·0	152	1,433	1,756	+323
33. Melancholia ...	45	47·6	145	1,167	1,020	—147
34. „ ...	45	67·1	166	1,394	1,341	— 53
35. Del. insanity ...	44	50·0	158	1,220	1,292	+ 72
36. Melancholia ...	50	45·0	152	1,132	1,272	+140
37. „ ...	43	61·7	170	1,358	1,592	+234
38. „ ...	35	53·0	159	1,292	1,604	+312
39. „ ...	56	59·4	150	1,238	1,480	+242

Square root of mean square deviation = 281·98 calories.

Percentage ratio of observed to predicted = 113·65.

TABLE II.—*Males (All).**Basal Metabolism.*

Mental Disorder.	Age.	Weight.	Height.	Predicted basal metabolism calories for 24 hours.	Ob- served values.	Differ- ence.
		Kilos.	Cms.			
1. Melancholia ...	52	47·0	164	1,182	1,281	+ 99
2. „ ...	53	67·0	166	1,461	1,800	+339
3. „ ...	54	84·6	189	1,811	1,848	+ 37
4. „ ...	53	63·4	173	1,439	1,337	—102
5. „ ...	35	61·2	168	1,512	1,253	—259
6. „ ...	40	68·0	180	1,632	1,812	+180
7. Mania ...	40	64·0	175	1,552	1,536	— 16
8. Obsessive insanity ...	21	64·0	168	1,646	1,951	+305
9. Melancholia ...	45	58·0	164	1,381	1,296	— 85
10. Del. insanity ...	42	54·4	168	1,372	1,771	+399
11. Dem. prae. ...	21	54·5	175	1,549	1,857	+308
12. Dementia ...	57	64·0	160	1,362	1,848	+486
13. Groves disease ...	37	59·6	172	1,497	1,800	+303
14. Del. insanity ...	39	48·0	164	1,294	1,553	+259
15. „ ...	35	61·2	170	1,522	1,701	+179
16. Dem. prae. ...	33	61·5	165	1,515	1,884	+369
17. Del. insanity ...	59	49·9	160	1,155	1,363	+208
18. Dem. prae. ...	32	69·8	184	1,730	2,025	+295
19. Melancholia ...	38	64·4	177	1,581	1,937	+356
20. Dem. prae. ...	32	58·0	168	1,488	1,505	+ 17
21. „ ...	33	56·8	175	1,502	1,644	+142
22. „ ...	39	58·5	168	1,448	1,717	+269
23. „ ...	25	61·2	178	1,630	1,651	+ 21
24. „ ...	18	52·6	170	1,520	1,718	+198
25. Melancholia ...	49	55·5	168	1,340	1,576	+236
26. Dem. prae. ...	22	52·6	174	1,512	1,632	+120
27. Epilepsy ...	30	60·4	166	1,525	1,493	-- 32
28. Imbecility ...	16	38·1	155	1,259	1,460	+201
29. Epilepsy ...	37	63·5	166	1,521	1,536	+ 15
30. Dem. prae. ...	40	58·0	165	1,419	1,363	— 56
31. Melancholia ...	52	47·2	164	1,185	1,272	+ 87
32. „ ...	53	66·7	167	1,457	1,800	+343
33. „ G.P.I. (?)	37	64·4	169	1,548	1,848	+300
34. Melancholia ...	54	84·6	189	1,811	2,400	+589
35. „ ...	35	61·2	168	1,512	1,320	—192
36. „ ...	53	63·5	173	1,448	1,344	—104
37. „ ...	40	68·0	180	1,632	1,800	+168
38. Mania ...	40	61·7	174	1,515	1,848	+333
39. Neurasthenia ...	21	64·0	168	1,646	1,944	+298
40. Melancholia ...	45	58·1	164	1,382	1,344	— 38
41. Del. insanity ...	42	54·4	168	1,372	1,776	+404

Square root of mean square deviation = 254·74.

Percentage ratio of observed to predicted = 111·47.

TABLE III.—*Females (suffering from melancholia).**Basal Metabolism.*

—	Age.	Weight.	Height.	Predicted basal metabolism for 24 hours.	Observed value.	Difference.
		Kilos.	Cms.			
1	44	53.5	157	1,252	1,440	+188
2	51	44.0	147	1,109	936	—173
3	39	58.1	161	1,326	1,944	+618
4	38	58.1	154	1,318	1,344	+ 26
5	45	50.8	163	1,232	1,200	— 32
6	51	68.0	165	1,372	1,680	+308
7	30	50.8	152	1,282	1,344	+ 62
8	51	51.3	157	1,198	1,104	— 94
9	42	54.0	146	1,245	1,296	+ 51
10	33	61.2	156	1,374	1,680	+306
11	44	53.5	158	1,254	1,448	+194
12	51	44.0	147	1,109	1,116	+ 7
13	38	58.0	154	1,317	1,333	+ 16
14	38	51.3	163	1,270	1,195	— 75
15	51	68.0	165	1,372	1,672	+300
16	52	51.3	158	1,195	1,308	+113
17	42	54.0	145	1,243	1,296	+ 53
18	33	61.2	156	1,374	1,672	+298
19	45	47.6	145	1,167	1,020	—147
20	45	67.1	166	1,394	1,341	— 53
21	50	45.0	152	1,132	1,272	+140
22	43	61.7	170	1,358	1,592	+234
23	35	53.0	159	1,292	1,604	+312
24	56	59.4	150	1,238	1,480	+242

Square root of mean square deviation = 218.45 calories.

Percentage ratio of observed to predicted = 109.51.

TABLE IV.—*Males (suffering from melancholia).**Basal Metabolism.*

—	Age.	Weight.	Height.	Predicted basal metabolism calories for 24 hours.	Observed values.	Difference.
		Kilos.	Cms.			
1	52	47.0	164	1,182	1,281	+ 99
2	53	67.0	166	1,461	1,800	+359
3	54	84.6	189	1,811	1,848	+ 37
4	53	63.4	173	1,439	1,337	—102
5	35	61.2	168	1,512	1,253	—259
6	40	68.0	180	1,632	1,812	+180
7	45	58.0	164	1,381	1,296	— 85
8	38	64.4	177	1,581	1,937	+356
9	49	55.5	168	1,340	1,576	+236
10	52	47.2	164	1,185	1,272	+ 87
11	53	66.7	167	1,457	1,800	+343
12	54	84.6	189	1,811	2,400	+589
13	35	61.2	168	1,512	1,320	—192
14	53	63.5	173	1,448	1,344	—104
15	40	68.0	180	1,632	1,800	+168
16	45	58.1	164	1,382	1,344	— 38

Square root of the mean square deviation = 246.8704.

Percentage ratio of observed to predicted = 106.96.

TABLE V.—Summary of Observed Results compared with those predicted from Benedict and Harris's equations.

		No.	Root—Mean Square Deviation.				Mean Values.			
			Theoretical.	Observed.	Difference.	Difference divided by Probable Error.	Predicted.	Observed.	Difference.	Difference divided by Probable Error.
Females (all)	...	39	*(i) 103.58 ± 8.10	281.98	178.40	22.0	(i) 1287.64 ± 11.49	1463.44	175.80	15.3
	...		(ii) 118.19 ± 9.24	„	163.79	17.7	(ii) 1326.96 ± 13.11	„	136.48	10.4
Males (all)	...	41	(i) 99.14 ± 7.55	254.74	155.60	20.6	(i) 1484.51 ± 10.71	1654.73	170.22	15.9
	...		(ii) 107.34 ± 8.18	„	147.40	18.0	(ii) 1519.29 ± 11.59	„	135.44	11.7
Females (melancholia)	...	24	(i) 102.95 ± 10.33	218.45	115.50	11.2	(i) 1267.63 ± 14.64	1388.21	120.58	8.2
	...		(ii) 117.47 ± 11.78	„	100.98	8.6	(ii) 1317.75 ± 16.71	„	70.46	4.2
Males (melancholia)	...	16	(i) 95.08 ± 12.01	246.87	151.79	12.6	1485.38 ± 17.14	1588.75	103.37	6.0
	...		(ii) 102.95 ± 13.01	„	143.92	11.1	1541.05 ± 18.56	„	47.7	2.6

* The theoretical values marked (i) are obtained on the assumption that the standard deviations of Harris and Benedict's equations give the true values, and those marked (ii) on the assumption that the true values exceed those of Harris and Benedict by three times, the Probable Error of the latter. The two theoretical values of the means are based on similar assumptions for the means as well as for the standard deviations.

APPENDIX D.

SPECIMEN FORMS OF TENDERS FOR PURCHASE OF MEAT, FISH, AND COCOA.

MEAT—Schedule 1.

MENTAL HOSPITAL.

Description.	Probable quantity.	Price per stone of 14 lbs.	Total.	Description.	Probable quantity.	Price per stone of 14 lbs.	Total.
Beef, ox, chilled, Argentine or Uruguayan (not frozen or defrosted) at the contractor's option :—	st.	s. d.	£ s. d.	(g) Thick flanks, without bone	st.	s. d.	£ s. d.
(a) Hind quarters, weighing not less than 180 lbs. ...				(h) Rump steaks ...			
(b) Fore quarters, weighing not less than 180 lbs. ...				(i) Clods and stickings, without bone ...			
(c) Ribs ...				(j) Legs and shins, without bone ...			
(d) Sirloins ...				(k) Silversides, fresh ...			
(e) Buttocks, without bone, weighing not less than 40 lbs. each ...				(l) Silversides, salted ...			
(f) Topsides ...				(m) Briskets, salted ...			
				(n) Suet, kidney ...			
				(o) Kidneys ...			
				(p) Chucks, leg of mutton pieces and short ribs, without bone ...			
				Total ...			

APPENDIX D—continued.

SPECIMEN FORMS OF TENDERS FOR PURCHASE OF MEAT, FISH, AND COCOA—continued.
MEAT—Schedule.

MENTAL HOSPITAL.

Description.	Probable quantity.	Price per stone of 14 lbs.	Total.	Description.	Probable quantity.	Price per stone of 14 lbs.	Total.
Mutton, wether, New Zealand :—				Pork, English—			
(a) In carcasses of 60 to 72 lbs. each, without heads, shanks, or inside suet ...	st.	s. d.	£ s. d.	(a) Loins ...	st.	s. d.	£ s. d.
(b) Legs, in pairs undivided, each pair weighing not less than 16 lbs. nor more than 20 lbs. ...				(b) Legs, without shanks, weighing not less than 8 lbs. nor more than 12 lbs. ...			
(c) Shoulders, not less than 6 lbs., nor more than 10 lbs. ...				(c) Legs (salted) ditto ...			
(d) Loins ...				(d) Hands (salted) without shanks ...			
(e) Necks, best ends ...				(e) Bellies (salted) ...			
(f) Necks, scrags ...							
(g) Whole necks ...				Veal, English :—			
Lamb, New Zealand :—				(a) Loins ...			
(a) Carcasses, weighing between 35 and 45 lbs. each ...				(b) Fillets, free from bone ...			
(b) Hind quarters ...				(c) Legs ...			
(c) Fore quarters ...				Liver, sheep's, freshly killed, up to 3 lbs. each ...			
(d) Legs ...				Sausage skins, prepared for use per 100 yards ...			
Total ...				Total ...			

Special Conditions of Contract.

- (B 34/1079)Q
- A.—Period of contract—1st October to 31st December, 1923, inclusive (three months).
 - B.—All meat shall be the best of its class.
 - C.—All meat shall be delivered in bright and sound condition, and in the case of frozen meat, properly thawed out.
 - D.—All meat shall be properly trimmed, free from excess fat or suet, and prepared for cooking. Excess fat or suet will be rejected.
 - E.—Mutton and lamb supplied in carcasses shall be delivered in the original wrappers in which the carcasses were shipped from New Zealand, and each carcass shall have attached to it the original tag of the company by whom the meat was slaughtered.
 - F.—Except in the case of an odd number of legs, when one single leg only shall be included to make up the number ordered, legs of mutton shall be cut and delivered in undivided pairs—each pair with the original tag left on.

G.—With every delivery of imported meat the contractor shall forward (on the delivery note or other approved form) a signed statement guaranteeing the country of origin of all the meat in that particular delivery.

H.—Meat for Sunday consumption shall be delivered, when required, on Saturdays, between 5 p.m. and 9 p.m., while that for week-day consumption shall be delivered by 8 a.m. on the day for which it is ordered.

I.—Only such quantities of goods as may be necessary will be ordered under this contract, without regard to the estimated quantities stated in the schedule.

Signature of tenderer.....

FISH—Schedule 2.

Three Months' Contract Period.

Schedule Number.	Description.	Mental Hospital.				
		Probable quantity.	Price per lb.	Total.		
	(1) WET FISH.†	lbs.	d.	£	s.	d.
1	Brill, from 1½ lbs. to 4 lbs.					
2	Cod, above 8 lbs. weight, and not exceeding 20 lbs.					
3	Haddock, fresh, from 1 lb. to 3 lbs.					
4	Hake, above 23 ins. long (April to January)					
5	Halibut, not less than 6 lbs. and not more than 28 lbs.					
6	Herrings, fresh					
7	Ling, above 8 lbs., and not exceed- ing 20 lbs. (November to April)... ..					
8	Mackerel (April to December)					
9	Plaice, 12 ozs. to 48 ozs. each					
10	„ fillets (net weight)					
11	Soles, lemon, not less than 12 ozs. each					
12	Soles, 8 ozs. to 16 ozs. each					
13	Whiting, above 8 ozs., and not ex- ceeding 24 ozs.					
	Total of Sec. (1).		£			
	(2) DRIED FISH.†					
14	Bloaters					
15	Haddock, above 1 lb. and not ex- ceeding 3 lbs.					
16	Herrings, red					
17	Kippers					
	Total of Sec. (2).		£			

In all cases the goods are to be delivered at the institutions to which this contract relates (unless otherwise ordered) free of charge and at the contractor's risk, *in such quantities*, at such times and places, and in such manner as the authorised officers shall from time to time order.

The term “in such quantities” shall mean that any quantity, however small, may be ordered, and that the same shall be charged for at a rate proportionate to that quoted in the schedule.

Special Conditions of Contract.

A.—Period of contract—three months.

B.—All fish shall be of the best quality and in the best condition of their respective kinds available from the recognised fishing grounds for the period of the year at which the supply is made.

C.—All fish shall be without offal and prepared for cooking, and the price shall be the price per lb. after being prepared for cooking. Cod, haddocks, hake, and ling shall be supplied without heads, and the weights given below are after removal of the heads. All prices quoted must be fully extended and totalled.

D.—All fish shall be delivered before 9.30 a.m., except when otherwise ordered.

E.—The contractor shall remove returnable “empties” not less frequently than once a week.

F.—The periods mentioned in this schedule shall be in every case inclusive. Where periods are specified the fish to which they relate will only be ordered during such periods. Where no special period is specified the fish may be ordered throughout the contract period.

G.—Only such quantities of goods as may be found necessary will be ordered under this contract, without regard to the estimated quantities stated in the schedule.

COCOA—Schedule 3.

Special Conditions of Contract.

A.—Period of contract—three months.

B.—All cocoa shall be the best of its class.

C.—Only such quantities of goods as may be found necessary will be ordered under this contract without regard to the estimated quantities stated in the schedule.

Probable quantity.	Cocoa.	Price per Cwt.	Total.
cwt.		s. d.	£ s. d.
	Prepared, to consist of at least 55 per cent. of cocoa nib, with all its natural fat, free from added and extraneous shell; the remainder to consist of arrowroot and sugar in fairly equal proportions.		
	All ingredients to be reduced to a fine powder before admixture, and the finished article to be thoroughly milled.		
	The cocoa to be employed to be of the best quality and to contain not more than 5 per cent. of defective beans.		
	The preparation to yield on analysis not less than 25 per cent. cocoa butter; to contain not more than 25 per cent. sugar; a total ash not exceeding 3·5 per cent. and an ash insoluble in hydrochloric acid not exceeding 0·25 per cent.		
	Pure, without admixture of cocoa shell or extraneous starch or sugar, deprived of not more than half its natural fat, and without addition of alkali during manufacture.		

Signature of tenderer

APPENDIX E.

SPECIFICATION AND DRAWINGS OF PLATE WARMERS IN USE AT WINWICK MENTAL HOSPITAL.

SPECIFICATION.

The plate warmers are all made one standard size: Length, 2 ft. 3 ins.; width, 2 ft.; depth, 1 ft. 7 $\frac{1}{4}$ ins., overall sizes.

Each is capable of holding 76 plates, and, in addition, meat dishes, basins, etc.

The outside casing is made from 18s gauge blue planished steel plates.

The inside casing is xxxx (4-cross) tin.

The diamond mesh lamp guard is 2 ins. by 1 in. meshed woven wire 10s gauge, galvanised after making. The divisions for holding plates apart are $\frac{1}{4}$ in. by $\frac{3}{4}$ in. rivets.

The wiring is bare single 18s copper wire, looped out from lamp to lamp, and insulated with glass or fishspine beads, these being used in preference to rubber insulation on account of the heat.

The leading-in wires are passed through a cast iron disconnecting box, and then through $\frac{3}{4}$ -in. piping to lamp housing.

A double pole snap switch in a locked box is used, also a small lamp (8 c.p.) is wired outside the heater to indicate when heater is in use, also to prevent the heater being left on when not in use.

The casing is earthed to the nearest water pipe, to take away any risks from shock, and the fuses are kept light to fuse easily if anything goes wrong.

The lamps used are the ordinary type radiator lamp, taking 250 watts each.

Each heater, after being completed, is tested between poles and to earth at 500 volts, to prove all is electrically sound.

The heaters are fixed in the ward sculleries, on T iron bearers, about 18 ins. from floor to underside heater.

The time taken to heat up the plates averages 1 $\frac{1}{4}$ hours.

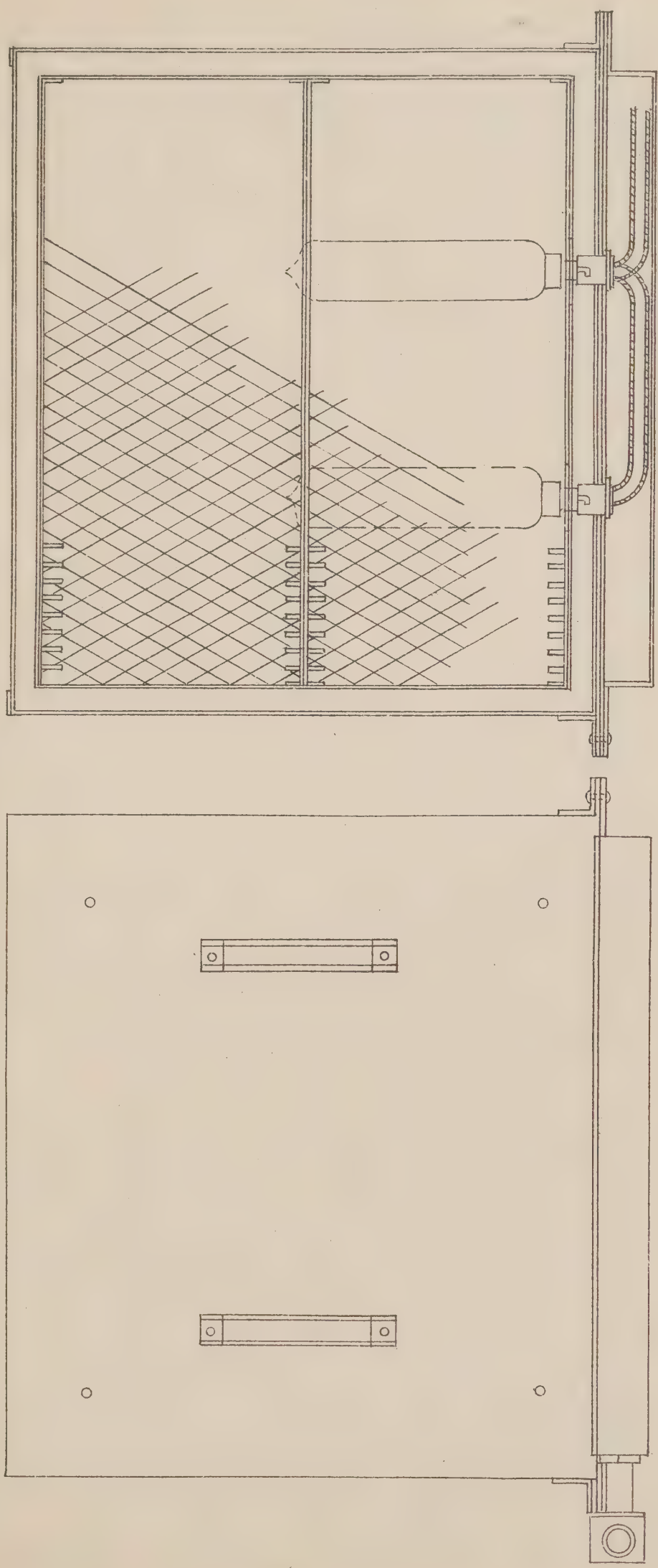
The cost to make the heater in our shops is £3 18s. each, and the total cost of altering the wiring in the ward, fixing bearers, switches, lamps, etc., is £5 18s. per heater, ready for use.

The cost to run, taking the price per unit at 1·8d. per unit, is approximately 2d. per ward per day.

W. H. HOUGHTON, A.M.I.M.E.,

Engineer.

WINWICK PLATE-WARMER.

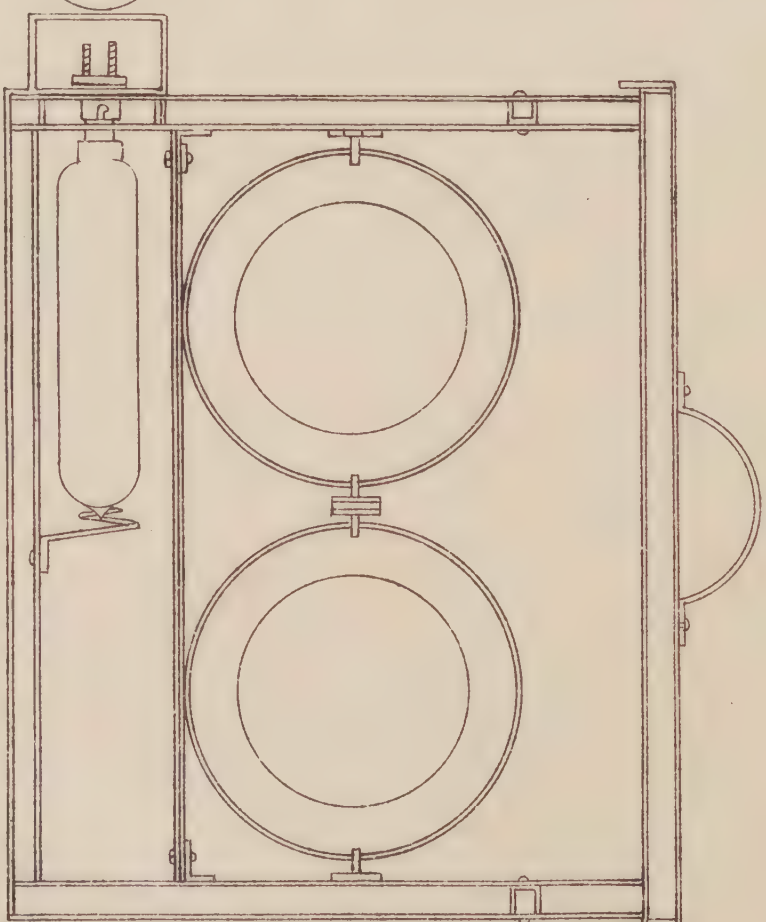


PLAN

WINWICK PLATE-WARMER.



FRONT ELEVATION.



SECTION.

APPENDIX F.

THE MODEL DIETARY.

FOR ADULT PATIENTS DURING WINTER MONTHS (OCTOBER TO MARCH, INCLUSIVE).

Breakfast.

Males	6 ozs. bread	} Daily.
Females	...	...	...	5 ozs. bread
Tea, coffee or cocoa...	...	...	...	1 pint
Margarine or butter	...	...	...	$\frac{1}{2}$ oz.

With one or other of the following extras.

Galantine of beef, brawn (beef or pork), veal loaf, breakfast sausage, corned beef, bacon, rissoles, black puddings, fish cakes, kedjeree, kipper, bloater, haddock, egg, marmalade, jam, cheese, macaroni cheese, or porridge.

The allowance for each patient for breakfast every other day is 2 ozs. of any of the above-mentioned prepared meats, 4 ozs. dried fish, or 1 oz. cheese or jam.

On alternate days with the above, $\frac{1}{2}$ pint porridge shall be supplied during the winter months.

The rotation of the breakfast meal shall be altered each month when the sequence of dinner meals is reconsidered.

Butter should be mixed with margarine in the proportion of 25 per cent. of the former to 75 per cent. of the latter, or be given ($\frac{1}{2}$ oz.) in place of margarine at seven breakfasts or teas (at least) during each two weeks.

Summer.—Porridge may be dropped entirely during the months April to September, inclusive, and its place taken in sequence by stewed fruit, marmalade, jam, or one or other of the "extras" mentioned above. In no case should breakfast consist of a beverage and bread and margarine (or butter) only.

Dinners.

October–March.

	Allowances.		Remarks.
	Males.	Females.	
<i>Meat, uncooked, and including bone</i>	*6 ozs.	*5 ozs.	—
<i>Bacon, boiled, ditto</i>	3 "	2 $\frac{1}{2}$ "	—
<i>Fish</i> (including bone-cleaned, ready for cooking)	8 "	7 "	—
<i>Rabbit or meat pie or pudding</i> ...	20 "	17 "	See formulæ.
<i>Soups</i>	1 pint	1 pint	"
<i>Stews</i>	1 "	1 "	"
<i>Potatoes</i> —			
Only with fish	9 ozs.	7 ozs.	Unpeeled and uncooked.
In addition to fresh vegetables with roast or boiled meat dinner	7 "	6 "	"
With stew	8 "	8 "	"
<i>Fresh vegetables</i> —i.e., greens, carrots, parsnips, turnips, onions, etc.	6 "	6 "	"
<i>Bread</i>	2 "	2 "	—
<i>Puddings</i> (flour), such as jam, treacle, raisin, currant, date, fig, ginger, bread, etc. ...	8 "	8 "	See formulæ.
<i>Puddings</i> (milk)—rice, sago, tapioca, semolina	$\frac{1}{2}$ pint	$\frac{1}{2}$ pint	"
<i>Bread and cheese</i> —			
Bread	2 ozs.	2 ozs.	—
Cheese	1 $\frac{1}{2}$ "	1 $\frac{1}{2}$ "	—

* If ovens of known temperature are used, and proper care is taken in carving, these figures should be equivalent to more than 3 ozs. and $2\frac{1}{2}$ ozs. of cooked meat for males and females, respectively. These amounts are for roast, boiled, or steamed meat dinners. If ordinary coal ranges or gas ovens are used for cooking, a larger amount of raw material will probably be required to yield the same result.

Alternative dinner dishes, more or less dependent upon local taste, are hot pot, cottage pie, shepherds pie, sea pie, liver and bacon, pork and beans, sausages, curried meat or rabbit, haricot ox tails, tripe and onions, etc.

An apple, orange or banana should be given for dessert at least twice a week throughout the winter months.

Summer.—During the months April to September, inclusive, some of the hot dinners should be replaced by cold, accompanied by salads, lettuces, radishes, tomatoes, etc. Fresh fruit puddings or stewed fruit should be substituted for some of the heavier suet puddings on other than soup days, and fresh uncooked fruit should be regularly supplied when obtainable at reasonable cost.

Tea.

October–March.

Males	5 ozs. bread	} Daily.
Females	...	...	...	...	3 ozs. bread
Cake	...	...	...	...	3 ozs.
Margarine or butter	...	...	...	...	$\frac{1}{2}$ oz.
*Tea	...	...	...	...	1 pint

* Cocoa or coffee may be issued if preferred.

With one or other of the following extras.

Jam or marmalade, 7 times per fortnight	...	1 oz. each patient.
Meat or fish paste, bloater, or shrimp and salmon, etc., 7 times per fortnight	...	$\frac{1}{2}$ oz. each patient.

The supply of cake should be varied, being made either with currants, sultanas, raisins or carraway seeds. Scones, buns or oatmeal biscuits of the same weight may be issued in lieu.

If preferred, the orange or apple suggested as an addition to the dinner meal may be given for tea twice weekly, replacing the meat or fish paste on these days.

Summer.—During summer months the jam or pastes should be replaced by fresh vegetables or fruit. Lettuces, onions, tomatoes, radishes, watercress, mustard and cress, or beetroot are desirable foods, for the regular provision of which arrangements should be made.

DIETARY SCALES.

The following tables show a sequence of dinner meals for male and female patients, respectively, covering a period of four weeks. They are designed to demonstrate in the clearest manner possible the amount and kind of food that, in our opinion, should be provided for this particular meal (during winter months) in order to secure sufficiency and variety. It is suggested that the order of these meals should be changed at the end of each four weeks, so that no particular dish can become associated with any particular day.

DINNERS—1ST WEEK.

Total Issues per 100 Male Patients. Suggested Dietary.

	Beef.	Mutton.	Rabbits.	Fish (hake).	Potatoes.	Greens.	Other vegetables.	Suet.	Flour.	Barley.	Lentils.	Split peas.	Sago.	Rice, tapioca, sago, semolina.	Baking powder.	Golden syrup and jam.	Sugar.	Raisins.	Milk.	Bread.
<i>Sunday</i> — Roast beef, potatoes, greens, milk pudding ...	37½	—	—	—	43¾	37½	—	—	—	—	—	—	—	6¼	—	—	3½	—	50	12½
<i>Monday</i> — Lentil soup, golden pudding ...	—	—	—	—	—	—	28½	6¼	12½	—	6¼	1½	3½	—	⅕	6¼	—	—	—	20⅕
<i>Tuesday</i> — Rabbit pie, greens ...	—	—	37½	—	50	37½	9¾	6¼	25	—	—	—	—	—	—	—	—	—	—	12½
<i>Wednesday</i> — Boiled mutton, potatoes, onions, jam roll pudding ...	—	37½	—	—	43¾	—	37½	6¼	12½	—	—	—	—	—	⅕	6¼	—	—	—	20⅕
<i>Thursday</i> — Meat stew, potatoes, dumplings... ..	25	—	—	—	50	—	37½	1¾	10⅔	3½	—	1½	—	—	—	—	—	—	—	12½
<i>Friday</i> — Fried hake, potatoes, raisin pudding ...	—	—	—	50	56¼	—	—	6¼	12½	—	—	—	—	—	⅕	—	3½	6¼	—	20⅕
<i>Saturday</i> — Meat puddings, greens	31¼	—	—	—	50	37½	9¾	6¼	25	—	—	—	—	—	—	—	—	—	—	12½
Total Issues ...	93¾	37½	37½	50	293¾	112½	121¼	33	98⅕	3½	6¼	3½	3½	6¼	⅕	12½	6¼	6¼	50	110⅕

DINNERS—2ND WEEK.

Total Issues per 100 Male Patients. Suggested Dietary.

	Golden syrup.	Beef.	Pork.	Fish.	Potatoes.	Greens.	Other vegetables.	Suet.	Flour.	Barley.	Split peas.	Sago.	Rice, tapioca, sago, semolina.	Baking powder.	Sugar.	Raisins.	Currants.	Milk.	Bread.	Cheese.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Pts.	Lbs.	Lbs.
<i>Sunday</i> — Roast pork, potatoes, greens, golden pudding	6½	—	37½	—	43¾	37½	—	6½	12½	—	—	—	—	⅝ ₁₆	—	—	—	—	20½ ₁₆	—
<i>Monday</i> — Meat pie, potatoes, greens	—	31¼	—	—	50	37½	9¾	6½	25	—	—	—	—	—	—	—	—	—	12½	—
<i>Tuesday</i> — Barley soup, raisin pudding	—	—	—	—	—	—	28⅞	6½	12½	4½ ₁₆	1⅞ ₁₆	3⅛	—	⅝ ₁₆	3⅛	6¼	—	—	20½ ₁₆	—
<i>Wednesday</i> — Fish pie and sauce, potatoes, currant pudding	—	—	—	50	56¼	—	—	6½	12½	—	—	—	—	⅝ ₁₆	3⅛	—	6¼	—	20½ ₁₆	—
<i>Thursday</i> — Roast beef, potatoes, greens, milk pudding	—	37½	—	—	43¾	37½	—	—	—	—	—	—	6¼	—	3⅛	—	—	50	12½	—
<i>Friday</i> — Meat stew, dumplings, potatoes	—	25	—	—	50	—	37½	1¾	10½ ₁₆	3⅛	1⅞ ₁₆	—	—	—	—	—	—	—	12½	—
<i>Saturday</i> — Boiled salt beef, potatoes, carrots, bread and cheese	—	37½	—	—	43¾	—	37½	—	—	—	—	—	—	—	—	—	—	—	25	9¾
Total Issues	6½	131¼	37½	50	287½	112½	112½	26¾	73½	7½ ₁₆	3⅛	3⅛	6¼	⅝ ₁₆	9¾	6¼	6¼	50	123½ ₁₆	9¾

	Golden syrup.	Beef.	Mutton.	Pork.	Fish (haddock).	Potatoes.	Greens.	Other vegetables.	Suet.	Flour.	Barley.	Split peas.	Sago.	Rice, tapioca, sago, semolina.	Baking powder.	Sugar.	Dates.	Raisins.	Milk.	Bread.	Curry powder.	Cheese.
<i>Sunday</i> — Roast mutton, potatoes, parsnips, milk pudding ...	—	—	37½	—	—	43¾	—	37½	—	—	—	—	—	6¼	—	3½	—	—	50	12½	—	—
<i>Monday</i> — Curried stew, potatoes, dumplings ...	—	25	—	—	—	50	—	37½	1¾	10 ⁹ / ₁₆	3½	1 ⁹ / ₁₆	—	—	—	—	—	—	—	12½	¾ ³ / ₁₆	—
<i>Tuesday</i> — Fried haddock, potatoes, raisin pudding ...	—	—	—	—	50	56¼	—	—	6¼	12½	—	—	—	—	⁵ / ₁₆	3½	—	6¼	—	20 ⁵ / ₁₆	—	—
<i>Wednesday</i> — Roast beef, potatoes, greens, bread and cheese ...	—	37½	—	—	—	43¾	37½	—	—	—	—	—	—	—	—	—	—	—	—	25	—	9¾
<i>Thursday</i> — Pea soup, date pudding ...	—	—	—	—	—	—	—	28½	6¼	12½	—	7 ¹³ / ₁₆	3½	—	⁵ / ₁₆	3½	6¼	—	—	20 ⁵ / ₁₆	—	—
<i>Friday</i> — Boiled salt pork, potatoes, carrots, golden pudding ...	6¼	—	—	37½	—	43¾	—	37½	6¼	12½	—	—	—	—	⁵ / ₁₆	—	—	—	—	20 ⁵ / ₁₆	—	—
<i>Saturday</i> — Meat stew, potatoes, dumplings... ..	—	25	—	—	—	50	—	37½	1¾	10 ⁹ / ₁₆	3½	1 ⁹ / ₁₆	—	—	—	—	—	—	—	12½	—	—
Total Issues	6¼	87½	37½	37½	50	287½	37½	178½	22¼	58½	6¼	10½	3½	6¼	1½	9¾	6¼	6¼	50	123 ⁷ / ₁₆	¾ ³ / ₁₆	9¾

	Beef.	Mutton.	Bacon.	Fish.	Potatoes.	Greens.	Other vegetables.	Suet.	Flour.	Barley.	Lentils.	Split peas.	Sago.	Haricot beans.	Rice, tapioca, sago, semolina.	Baking powder.	Sugar.	Raisins.	Currants.	Milk.	Bread.	Rabbit.	Treacle.	Cheese.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Pts.	Lbs.	Lbs.	Lbs.	Lbs.
Sunday—																								
Meat pudding, greens	31 $\frac{1}{4}$	—	—	—	50	37 $\frac{1}{2}$	9 $\frac{3}{8}$	6 $\frac{1}{4}$	25	—	—	—	—	—	—	—	—	—	—	—	12 $\frac{1}{2}$	—	—	—
Monday—																								
Roast beef, potatoes, greens, milk pudding ...	37 $\frac{1}{2}$	—	—	—	43 $\frac{3}{4}$	37 $\frac{1}{2}$	—	—	—	—	—	—	—	—	6 $\frac{1}{4}$	—	3 $\frac{1}{8}$	—	—	50	12 $\frac{1}{2}$	—	—	—
Tuesday—																								
Boiled bacon, potatoes, haricot beans, bread and cheese ...	—	—	18 $\frac{3}{4}$	—	43 $\frac{3}{4}$	—	—	—	—	—	—	—	—	7	—	—	—	—	—	—	25	—	—	9 $\frac{3}{8}$
Wednesday—																								
Lentil soup, currant pudding ...	—	—	—	—	—	—	28 $\frac{1}{8}$	6 $\frac{1}{4}$	12 $\frac{1}{2}$	—	6 $\frac{1}{4}$	1 $\frac{9}{16}$	3 $\frac{1}{8}$	—	—	$\frac{5}{16}$	3 $\frac{1}{8}$	—	6 $\frac{1}{4}$	—	20 $\frac{5}{16}$	—	—	—
Thursday—																								
Fish pie and sauce, raisin pudding ...	—	—	—	50	56 $\frac{1}{4}$	—	—	6 $\frac{1}{4}$	12 $\frac{1}{2}$	—	—	—	—	—	—	$\frac{5}{16}$	3 $\frac{1}{8}$	6 $\frac{1}{4}$	—	—	20 $\frac{5}{16}$	—	—	—
Friday—																								
Rabbit stew, potatoes, dumplings	—	—	—	—	50	—	37 $\frac{1}{2}$	1 $\frac{3}{4}$	10 $\frac{9}{16}$	3 $\frac{1}{8}$	—	1 $\frac{9}{16}$	—	—	—	—	—	—	—	—	12 $\frac{1}{2}$	31 $\frac{1}{4}$	—	—
Saturday—																								
Roast mutton, potatoes, onions, plain suet pudding, and treacle ...	—	37 $\frac{1}{2}$	—	—	43 $\frac{3}{4}$	37 $\frac{1}{2}$	—	3 $\frac{1}{2}$	21 $\frac{1}{16}$	—	—	—	—	—	—	—	—	—	—	—	12 $\frac{1}{2}$	—	—	6 $\frac{1}{4}$
Total Issues ...	68 $\frac{3}{4}$	37 $\frac{1}{2}$	18 $\frac{3}{4}$	50	287 $\frac{1}{2}$	112 $\frac{1}{2}$	75	24	81 $\frac{5}{8}$	3 $\frac{1}{8}$	6 $\frac{1}{4}$	3 $\frac{1}{8}$	3 $\frac{1}{8}$	7	6 $\frac{1}{4}$	$\frac{5}{8}$	9 $\frac{3}{8}$	6 $\frac{1}{4}$	6 $\frac{1}{4}$	50	115 $\frac{5}{8}$	31 $\frac{1}{4}$	6 $\frac{1}{4}$	9 $\frac{3}{8}$

DINNERS—1ST WEEK.

Total Issues per 100 Female Patients. Suggested Dietary.

	Beef.	Mutton.	Rabbits.	Fish (hake).	Potatoes.	Greens.	Other vegetables.	Suet.	Flour.	Barley.	Lentils.	Split peas.	Sago.	Rice, tapioca, sago, semolina.	Baking powder.	Golden syrup and jam.	Sugar.	Raisins.	Milk.	Bread.
<i>Sunday—</i> Roast beef, potatoes, greens, milk pudding ...	31 $\frac{1}{4}$	—	—	—	37 $\frac{1}{2}$	37 $\frac{1}{2}$	—	—	—	—	—	—	—	6 $\frac{1}{4}$	—	—	3 $\frac{1}{8}$	—	50	12 $\frac{1}{2}$
<i>Monday—</i> Lentil soup, golden pudding ...	—	—	—	—	—	—	28 $\frac{1}{8}$	6 $\frac{1}{4}$	12 $\frac{1}{2}$	—	6 $\frac{1}{4}$	1 $\frac{9}{16}$	3 $\frac{1}{8}$	—	5 $\frac{5}{16}$	6 $\frac{1}{4}$	—	—	—	20 $\frac{5}{16}$
<i>Tuesday—</i> Rabbit pie, greens ...	—	—	31 $\frac{7}{8}$	—	42 $\frac{1}{2}$	37 $\frac{1}{2}$	8	5 $\frac{5}{16}$	21 $\frac{1}{4}$	—	—	—	—	—	—	—	—	—	—	12 $\frac{1}{2}$
<i>Wednesday—</i> Boiled mutton, potatoes, greens, jam roll pudding ...	—	31 $\frac{1}{4}$	—	—	37 $\frac{1}{2}$	37 $\frac{1}{2}$	—	6 $\frac{1}{4}$	12 $\frac{1}{2}$	—	—	—	—	—	5 $\frac{5}{16}$	6 $\frac{1}{4}$	—	—	—	20 $\frac{5}{16}$
<i>Thursday—</i> Meat stew, potatoes, dumplings... ..	25	—	—	—	50	—	37 $\frac{1}{2}$	1 $\frac{3}{4}$	10 $\frac{9}{16}$	3 $\frac{1}{8}$	—	1 $\frac{9}{16}$	—	—	—	—	—	—	—	12 $\frac{1}{2}$
<i>Friday—</i> Fried hake, potatoes, raisin puddings ...	—	—	—	43 $\frac{3}{4}$	43 $\frac{3}{4}$	—	—	6 $\frac{1}{4}$	12 $\frac{1}{2}$	—	—	—	—	—	5 $\frac{5}{16}$	—	3 $\frac{1}{8}$	6 $\frac{1}{4}$	—	20 $\frac{5}{16}$
<i>Saturday—</i> Meat pudding, greens	26 $\frac{9}{16}$	—	—	—	42 $\frac{1}{2}$	37 $\frac{1}{2}$	8	5 $\frac{5}{16}$	21 $\frac{1}{4}$	—	—	—	—	—	—	—	—	—	—	12 $\frac{1}{2}$
Total Issues ...	82 $\frac{13}{16}$	31 $\frac{1}{4}$	31 $\frac{7}{8}$	43 $\frac{3}{4}$	253 $\frac{3}{4}$	150	81 $\frac{5}{8}$	31 $\frac{1}{8}$	90 $\frac{9}{16}$	3 $\frac{1}{8}$	6 $\frac{1}{4}$	3 $\frac{1}{8}$	3 $\frac{1}{8}$	6 $\frac{1}{4}$	15 $\frac{5}{16}$	12 $\frac{1}{2}$	6 $\frac{1}{4}$	6 $\frac{1}{4}$	50	110 $\frac{15}{16}$

	Beef.	Pork.	Fish.	Potatoes.	Greens.	Other vegetables.	Suet.	Flour.	Barley.	Split peas.	Sago.	Rice, tapioca, sago, semolina.	Baking powder.	Sugar.	Raisins.	Currants.	Milk.	Bread.	Golden syrup.	Cheese.
<i>Sunday</i> — Roast pork, potatoes, greens, golden pudding ...	—	31½	—	37½	37½	—	6½	12½	—	—	—	—	⅝	—	—	—	—	20⅝	6½	—
<i>Monday</i> — Meat pie, potatoes, greens ...	26⅝	—	—	42½	37½	8	5⅝	21½	—	—	—	—	—	—	—	—	—	12½	—	—
<i>Tuesday</i> — Barley soup, raisin pudding ...	—	—	—	—	—	28½	6½	12½	4½	1⅝	3⅝	—	⅝	3⅝	6½	—	—	20⅝	—	—
<i>Wednesday</i> — Fish pie and sauce, potatoes, currant pudding ...	—	—	43¾	43¾	—	—	6½	12½	—	—	—	—	⅝	3⅝	—	6½	—	20⅝	—	—
<i>Thursday</i> — Roast beef, potatoes, greens, milk pudding ...	31½	—	—	37½	37½	—	—	—	—	—	—	6½	—	3⅝	—	—	50	12½	—	—
<i>Friday</i> — Meat stew, dumplings, potatoes ...	25	—	—	50	—	37½	1⅝	10⅝	3⅝	1⅝	—	—	—	—	—	—	—	12½	—	—
<i>Saturday</i> — Boiled salt beef, potatoes, carrots, bread and cheese...	31½	—	—	37½	37½	—	—	—	—	—	—	—	—	—	—	—	—	25	—	9¾
Total Issues ...	114⅝	31½	43¾	248¾	150	73⅝	25⅝	69⅝	7⅝	3⅝	3⅝	6½	⅝	9¾	6½	6½	50	123⅝	6½	9¾

	Beef.	Mutton.	Pork.	Fish (haddock).	Potatoes.	Greens.	Other Vegetables.	Suet.	Flour.	Barley.	Split peas.	Sago.	Rice, tapioca, sago, semolina.	Baking powder.	Sugar.	Dates.	Raisins.	Milk.	Bread.	Curry powder.	Golden syrup.	Cheese.
<i>Sunday</i> — Roast mutton, potatoes, parsnips or greens, milk pudding ...	—	31 $\frac{1}{4}$	—	—	37 $\frac{1}{2}$	37 $\frac{1}{2}$	—	—	—	—	—	—	6 $\frac{1}{4}$	—	3 $\frac{1}{8}$	—	—	50	12 $\frac{1}{2}$	—	—	—
<i>Monday</i> — Curried stew, potatoes, dumplings	25	—	—	—	50	—	37 $\frac{1}{2}$	1 $\frac{3}{4}$	10 $\frac{9}{16}$	3 $\frac{1}{8}$	1 $\frac{9}{16}$	—	—	—	—	—	—	—	12 $\frac{1}{2}$	$\frac{3}{16}$	—	—
<i>Tuesday</i> — Fried haddock, potatoes, raisin pudding ...	—	—	—	43 $\frac{3}{4}$	43 $\frac{3}{4}$	—	—	6 $\frac{1}{4}$	12 $\frac{1}{2}$	—	—	—	—	$\frac{5}{16}$	3 $\frac{1}{8}$	—	6 $\frac{1}{4}$	—	20 $\frac{5}{16}$	—	—	—
<i>Wednesday</i> — Roast beef, potatoes, greens, bread and cheese ...	31 $\frac{1}{4}$	—	—	—	37 $\frac{1}{2}$	37 $\frac{1}{2}$	—	—	—	—	—	—	—	—	—	—	—	—	25	—	—	9 $\frac{3}{8}$
<i>Thursday</i> — Pea soup, date pudding ...	—	—	—	—	—	—	28 $\frac{1}{8}$	6 $\frac{1}{4}$	12 $\frac{1}{2}$	—	7 $\frac{13}{16}$	3 $\frac{1}{8}$	—	$\frac{5}{16}$	3 $\frac{1}{8}$	6 $\frac{1}{4}$	—	—	20 $\frac{5}{16}$	—	—	—
<i>Friday</i> — Boiled salt pork, potatoes, carrots, golden pudding ...	—	—	31 $\frac{1}{4}$	—	37 $\frac{1}{2}$	—	37 $\frac{1}{2}$	6 $\frac{1}{4}$	12 $\frac{1}{2}$	—	—	—	—	$\frac{5}{16}$	—	—	—	—	20 $\frac{5}{16}$	—	6 $\frac{1}{4}$	—
<i>Saturday</i> — Meat stew, potatoes, dumplings...	25	—	—	—	50	—	37 $\frac{1}{2}$	1 $\frac{3}{4}$	10 $\frac{9}{16}$	3 $\frac{1}{8}$	1 $\frac{9}{16}$	—	—	—	—	—	—	—	12 $\frac{1}{2}$	—	—	—
Total Issues ...	81 $\frac{1}{4}$	31 $\frac{1}{4}$	31 $\frac{1}{4}$	43 $\frac{3}{4}$	256 $\frac{1}{4}$	75	140 $\frac{5}{8}$	22 $\frac{1}{4}$	58 $\frac{5}{8}$	6 $\frac{1}{4}$	10 $\frac{15}{16}$	3 $\frac{1}{8}$	6 $\frac{1}{4}$	$\frac{15}{16}$	9 $\frac{3}{8}$	6 $\frac{1}{4}$	6 $\frac{1}{4}$	50	123 $\frac{7}{16}$	$\frac{3}{16}$	6 $\frac{1}{4}$	9 $\frac{3}{8}$

	Beef.	Mutton.	Bacon.	Rabbits.	Fish.	Potatoes.	Greens.	Other vegetables.	Suet.	Flour.	Barely.	Lentils.	Split peas.	Sago.	Haricot beans.	Rice, tapioca, sago, semolina.	Baking powder.	Sugar.	Raisins.	Currants.	Milk.	Bread.	Cheese.	Treacle.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Pts.	Lbs.	Lbs.	Lbs.
Sunday— Meat pudding, greens	26 ⁹ / ₁₆	—	—	—	—	42 ¹ / ₂	37 ¹ / ₂	8	5 ⁵ / ₁₆	21 ¹ / ₄	—	—	—	—	—	—	—	—	—	—	—	12 ¹ / ₂	—	
Monday— Roast beef, potatoes, greens, milk pudding ...	31 ¹ / ₄	—	—	—	—	37 ¹ / ₂	37 ¹ / ₂	—	—	—	—	—	—	—	—	6 ¹ / ₄	—	3 ¹ / ₈	—	—	50	12 ¹ / ₂	—	
Tuesday— Boiled bacon, potatoes, haricot beans, bread and cheese ...	—	—	15 ⁵ / ₈	—	—	37 ¹ / ₂	—	—	—	—	—	—	—	—	7	—	—	—	—	—	—	25	9 ³ / ₈	
Wednesday— Lentil soup, currant pudding ...	—	—	—	—	43 ³ / ₄	43 ³ / ₄	—	28 ¹ / ₈	6 ¹ / ₄	12 ¹ / ₂	—	6 ¹ / ₄	1 ⁹ / ₁₆	3 ¹ / ₈	—	—	⁵ / ₁₆	3 ¹ / ₈	—	6 ¹ / ₄	—	20 ⁵ / ₁₆	—	
Thursday— Fish pie and sauce, potatoes, raisin pudding ...	—	—	—	—	—	—	—	—	6 ¹ / ₄	12 ¹ / ₂	—	—	—	—	—	—	⁵ / ₁₆	3 ¹ / ₈	6 ¹ / ₄	—	—	20 ⁵ / ₁₆	—	
Friday— Rabbit stew, potatoes, dumplings	—	—	—	31 ¹ / ₄	—	50	—	37 ¹ / ₂	1 ³ / ₄	10 ⁹ / ₁₆	3 ¹ / ₈	—	1 ⁹ / ₁₆	—	—	—	—	—	—	—	—	12 ¹ / ₂	—	
Saturday— Roast mutton, potatoes, onions, plain suet pudding and treacle ...	—	31 ¹ / ₄	—	—	—	37 ¹ / ₂	—	37 ¹ / ₂	3 ¹ / ₂	21 ¹ / ₁₆	—	—	—	—	—	—	—	—	—	—	—	12 ¹ / ₂	6 ¹ / ₄	
Total Issues ...	57 ¹³ / ₁₆	31 ¹ / ₄	15 ⁵ / ₈	31 ¹ / ₄	43 ³ / ₄	248 ³ / ₄	75	111 ¹ / ₈	23 ¹ / ₁₆	77 ⁷ / ₈	3 ¹ / ₈	6 ¹ / ₄	3 ¹ / ₈	3 ¹ / ₈	7	6 ¹ / ₄	⁵ / ₈	9 ³ / ₈	6 ¹ / ₄	6 ¹ / ₄	50	115 ⁵ / ₈	9 ³ / ₈	6 ¹ / ₄

NUTRITIVE AND ENERGY VALUES OF MODEL DIETARY.

Males.

				Proteins.	Fats.	Carbo- hydrates.	Energy Value.
				Grms.	Grms.	Grms.	Calories.
Breakfast—							
Per patient per week	...	...		287·84	383·04	830·34	8,146·32
Per patient per day...	...	...		41·12	54·72	118·62	1,163·76
Tea—							
Per patient per week	...	...		128·03	150·31	1,065·52	6,291·26
Per patient per day...	...	...		18·29	21·47	152·22	898·75
Dinner, 1st week—							
Per patient per week	...	...		273·11	325·43	1,065·95	8,518·38
Per patient per day...	...	...		39·02	46·49	152·28	1,216·91
Dinner, 2nd week—							
Per patient per week	...	...		262·57	342·66	1,015·87	8,433·54
Per patient per day...	...	...		37·51	48·95	145·12	1,204·79
Dinner, 3rd week—							
Per patient per week	...	...		249·64	337·68	972·87	8,153·99
Per patient per day...	...	...		35·66	48·24	138·98	1,164·86
Dinner, 4th week—							
Per patient per week	...	...		274·71	311·39	1,040·47	8,293·27
Per patient per day...	...	...		39·24	44·48	148·64	1,184·75
Dinner—							
Average value per week	...	...		265·01	329·29	1,023·79	8,349·80
Average value per day	...	...		37·86	47·04	146·26	1,192·83
Total average value per week	...	...		680·88	862·64	2,919·65	22,787·38
Total average value per day ...	...	...		97·27	123·23	417·09	3,255·34

NUTRITIVE AND ENERGY VALUES OF MODEL DIETARY.

Females.

			Proteins.	Fats.	Carbo- hydrates.	Energy Value.
			Grms.	Grms.	Grms.	Calories.
Tea—						
Per patient per week	...	...	100·25	149·92	875·05	5,392·64
Per patient per day	...	...	14·32	21·42	125·05	770·38
Breakfast—						
Per patient per week	...	...	273·95	382·84	735·09	7,697·00
Per patient per day	...	...	39·14	54·69	105·01	1,099·57
Dinner, 1st week—						
Per patient per week	...	...	255·41	278·96	1,007·70	7,774·54
Per patient per day...	...	...	36·49	39·85	143·96	1,110·65
Dinner, 2nd week—						
Per patient per week	...	...	242·48	308·49	971·64	7,852·73
Per patient per day...	...	...	34·64	44·07	138·81	1,121·82
Dinner, 3rd week—						
Per patient per week	...	...	236·08	309·24	948·42	7,733·36
Per patient per day...	...	...	33·73	44·18	135·49	1,104·77
Dinner, 4th week—						
Per patient per week	...	...	254·87	277·12	988·32	7,678·96
Per patient per day...	...	...	36·41	39·59	141·19	1,096·99
Dinner—						
Average value per week	...	...	247·21	293·45	979·02	7,759·90
Average value per day	...	...	35·32	41·92	139·86	1,108·56
Total average value per week	...	...	621·41	826·21	2,589·16	20,849·54
Total average value per day ...	...	...	88·77	118·03	369·88	2,978·51

Meal.	For tuberculous and other cases requiring a specially nourishing diet.			Infirm and Convalescent Diets.									Sick Diets.					
	1			2			3			4			5			6		
	—	M.	F.		M.	F.	—	M.	F.	—	M.	F.	—	M.	F.	—	M.	F.
BREAKFAST	As ordinary diet, except that all margarine is replaced by butter.	—	—	Bread ozs.	6	5	Bread ozs.	6	5	Bread ozs.	4	4	Bread ozs.	4	4	Bread and milk—		
				Butter ozs.	$\frac{1}{2}$	$\frac{1}{2}$	Butter ozs.	$\frac{1}{2}$	$\frac{1}{2}$	Butter ozs.	$\frac{1}{2}$	$\frac{1}{2}$	Butter ozs.	$\frac{1}{2}$	$\frac{1}{2}$	Bread ozs.	4	4
				Porridge ... pint	$\frac{1}{2}$	$\frac{1}{2}$	Porridge ... pint	$\frac{1}{2}$	$\frac{1}{2}$	Tea or cocoa ... pint	$\frac{3}{4}$	$\frac{3}{4}$	Tea or cocoa ... pint	$\frac{1}{2}$	$\frac{1}{2}$	Milk pint	$\frac{1}{2}$	$\frac{1}{2}$
				With milk ... pint	$\frac{1}{4}$	$\frac{1}{4}$	With milk ... pint	$\frac{1}{4}$	$\frac{1}{4}$	Egg (every other day) No.	1	1				Sugar ozs.	$\frac{1}{4}$	$\frac{1}{4}$
	10.30 a.m. Milk pint	$\frac{1}{2}$	$\frac{1}{2}$										10.30 a.m. Milk pint	$\frac{1}{2}$	$\frac{1}{2}$	10.30 a.m. Milk pint	$\frac{1}{4}$	$\frac{1}{4}$
DINNER	As ordinary diet.	—	—	Meat (minced) ... ozs.	4	4	Soup (meat) ... pint	1	1	Fish ozs.	8	8	Beef tea, or mutton broth pint	$\frac{1}{2}$	$\frac{1}{2}$	Beef tea, or mutton broth pint	$\frac{1}{2}$	$\frac{1}{2}$
				Potatoes (mashed) ozs.	7	6	Bread ozs.	2	2	Bread ozs.	2	2	Bread ozs.	2	2	Egg custard ... pint	$\frac{1}{2}$	$\frac{1}{2}$
				Greens (minced) ozs.	6	6	Potatoes ozs.	9	7	Milk pudding pint	$\frac{1}{2}$	$\frac{1}{2}$	Milk pudding (made with egg) pint	$\frac{1}{2}$	$\frac{1}{2}$			
				Milk pudding (made with egg) pint	$\frac{1}{2}$	$\frac{1}{2}$	or Potatoes ... ozs.	7	6	Stewed fruit ... ozs.	4	4						
				Stewed fruit ... ozs.	4	4	Milk pudding ... pint	$\frac{1}{2}$	$\frac{1}{2}$									
TEA	As ordinary diet, except that all margarine is replaced by butter.	—	—	Bread ozs.	6	5	Bread ozs.	6	5	Bread ozs.	4	4	Bread ozs.	4	4	Bread and milk—		
				Butter ozs.	$\frac{1}{2}$	$\frac{1}{2}$	Butter ozs.	$\frac{1}{2}$	$\frac{1}{2}$	Butter ozs.	$\frac{1}{2}$	$\frac{1}{2}$	Butter ozs.	$\frac{1}{2}$	$\frac{1}{2}$	Bread ozs.	4	4
				Jam ozs.	1	1	Jam ozs.	1	1	Tea pint	$\frac{3}{4}$	$\frac{3}{4}$	Tea pint	$\frac{1}{2}$	$\frac{1}{2}$	Milk pint	$\frac{1}{2}$	$\frac{1}{2}$
				Tea pint	$\frac{3}{4}$	$\frac{3}{4}$	Tea pint	$\frac{3}{4}$	$\frac{3}{4}$	Egg, when not given for breakfast No.	1	1				Sugar... .. ozs.	$\frac{1}{4}$	$\frac{1}{4}$
	7 p.m. Milk pint	$\frac{1}{2}$	$\frac{1}{2}$										7 p.m. Milk pint	$\frac{1}{2}$	$\frac{1}{2}$	7 p.m. Milk pint	$\frac{1}{2}$	$\frac{1}{2}$

Milk (5 ozs.) every two hours, replaced on three occasions during the 24 hours with beef tea or mutton broth (5 ozs.).

INGREDIENT TABLE.

Food.	Quantity.	Ingredients.
Batter (for frying fish)	—	Flour, 4 ozs. ; fat, $\frac{1}{2}$ oz. ; salt to taste ; water, a sufficiency (for 2 lbs. fish). NOTE.—High grade fish oil can be used with advantage for fish frying.
Batter pudding ...	lb.	Flour, 8 ozs. ; milk, 6 ozs. ; fat, $\frac{1}{2}$ oz. ; baking powder, $\frac{1}{2}$ oz. ; pepper and salt to taste ; water, a sufficiency.
Beans, haricot ...	lb.	Haricot beans, 8 ozs. ; fat, $\frac{1}{4}$ oz. ; pepper and salt to taste ; water, a sufficiency.
Beef tea	pint	Leg and shins beef (including bone), $1\frac{1}{2}$ lbs. ; water, a sufficiency.
Bouillon (beef broth) ...	pint	Raw beef, free from bone, 3 ozs. ; mixed vegetables, 5 ozs. ; pepper and salt to taste ; herbs ; water, a sufficiency.
Bloater paste... ..	15 ozs.	Bloaters, 1 lb. ; rice, 1 oz. ; margarine, 2 ozs. NOTE.—Remove the head and tail from the bloaters, and cook ; then remove the backbone. The rice should be steamed. Run the bloater through the "Hobart" machine, using a fine plate, then add the rice and margarine and again run through the machine until the whole is well mixed. (Approximate cost, 7d. per lb.)
Bread-and-butter pudding	lb.	Bread, 6 ozs. ; milk, 10 ozs. ; margarine, 1 oz. ; sugar, 1 oz. ; raisins or currants, 1 oz.
Brawn	30-35 lbs.	Clods and stickings, 7 lbs. ; cow heels, 1 set (scalded, approximate weight, 16 lbs.) ; spice, 1 oz. ; saltpetre, 1 oz. ; salt, 2 lbs. ; pepper, $1\frac{1}{2}$ ozs. NOTE.—Clean the heels, split them lengthways and remove the large bone from the fetlock. Place the whole in boiler and cover with cold water. Add salt, 1 lb., and saltpetre, 1 oz., and bring to the boil, after which gently simmer for 10 hours, carefully removing scum to secure clarity. Then cut up meat in about $\frac{1}{2}$ -inch pieces by the "Hobart" machine, and add the meat to the liquor in sufficient time to secure one hour's cooking of the whole together (<i>i.e.</i> , meat to be added after cow heels have simmered 9 hours), having previously added the remaining salt pepper, and spice. Reduce cow heels to $\frac{1}{2}$ -inch pieces by hand cutting. Remove all scum, collect all meat in a wire receptacle, dividing equally the meat and liquor into the bowls or tins in which the brawn will remain until set. Care should be taken, by slow stirring, to secure even distribution of meat in gelatine. (Approximate cost, 4d. per lb.)

INGREDIENT TABLE—*continued.*

Food.	Quantity.	Ingredients.
Bread pudding (baked or steamed)	lb.	Bread, 5 ozs. ; sugar, 1 oz. ; fat, 1 oz. ; currants or raisins, 1 oz. ; milk, $2\frac{1}{2}$ ozs. ; water, $2\frac{1}{2}$ ozs. ; mixed spice to taste.
Breakfast sausage (galantine)	lb.	Bread, 6 ozs. ; beef, 12 ozs. ; spice to taste (may be covered with a thin coating of gelatine).
Beverages— Tea	100 pints	Tea, 1 lb. ; sugar, 3 lbs. ; milk, $1\frac{1}{2}$ gallons ; water, a sufficiency. NOTE.—By reducing the size of the leaf with the Hobart machine a number of hospitals have been able to reduce the quantity of tea required for 100 pints from 1 lb. to 13 ozs., with equally good results.
Coffee	100 pints.	Coffee, 2 lbs. ; sugar, 3 lbs. ; milk, $1\frac{1}{2}$ gallons ; water, a sufficiency.
Cocoa	100 pints	Cocoa, 3 lbs. ; sugar, 3 lbs. ; milk, $1\frac{1}{2}$ gallons ; water, a sufficiency. NOTE.—It is to be regretted that cocoa is not more commonly used as a beverage. The reason is probably to be found in the variety of compounds on the market, some of which are unsatisfactory. Advantage would accrue from the general use of the specification form on page 101 of this Report.
Cake (fruit)	100 lbs.	Flour, 50 lbs.; currants, raisins or sultanas, $12\frac{1}{2}$ lbs. ; milk, $12\frac{1}{2}$ pints ; sugar, 10 lbs. ; dripping or margarine, 8 lbs. ; baking powder, $1\frac{1}{2}$ lbs. ; salt to taste ; water, a sufficiency.
Cake (seed)	100 lbs.	Flour, 50 lbs. ; carraway seeds, $1\frac{1}{2}$ lbs. ; milk, $12\frac{1}{2}$ pints ; sugar, 10 lbs. ; dripping or margarine, 8 lbs. ; baking powder, $1\frac{1}{2}$ lbs. ; salt to taste ; water, a sufficiency.
Cheese and potato pie	—	Dry cheese (grated), $2\frac{1}{2}$ lbs. ; ground rice or maize semolina, 3 lbs. ; potatoes, 40 lbs. ; water, 24 pints ; mustard, 1 oz. ; salt, $1\frac{1}{2}$ ozs. ; pepper, $\frac{1}{4}$ oz.
Collops (minced) ...	lb.	Raw beef (free from bone), 16 ozs. ; onion, $\frac{1}{2}$ oz. ; water, a sufficiency.
Cottage pie	lb.	Raw beef, free from bone, 5 ozs. ; fat, $\frac{1}{4}$ oz. ; carrots, onions and turnips, 5 ozs. ; flour, $\frac{1}{4}$ oz. ; water, a sufficiency ; pepper and salt to taste. For crust.—Flour, 2 ozs. ; fat, $\frac{3}{4}$ oz. ; water, a sufficiency.
Currant pudding ...	lb.	Currants, 2 ozs. ; bread, $2\frac{1}{2}$ ozs. ; flour, 4 ozs. ; suet, 2 ozs. ; sugar, 1 oz. ; baking powder, approximately $\frac{1}{10}$ th oz. ; water, a sufficiency.

INGREDIENT TABLE—*continued.*

Food.			Quantity.	Ingredients.
Curry powder	...	...	quart	Pale turmeric, 6 ozs.; best powdered ginger, 1 oz.; black pepper, 5 ozs.; red cayenne pepper, 1 oz.; fennyquick seed, 2 ozs.; coriander seed, 13 ozs.; cummin seed, 3 ozs. NOTE.—All to be finely powdered, well dried, and carefully mixed. (A quart, if home made, should cost about 6s.).
Custard	...	...	each person	Egg, 1; $\frac{3}{4}$ -pint milk; sugar, 1 oz.
Date pudding	...	...	lb.	Dates (without stones), 2 ozs.; bread, $2\frac{1}{2}$ ozs.; flour, 4 ozs.; suet, 2 ozs.; sugar, 1 oz.; baking powder, approximately 1/10th oz.; water, a sufficiency.
Dumplings	...	...	lb.	Flour, 9 ozs.; suet, $1\frac{1}{2}$ ozs.; water, a sufficiency.
Fig pudding	...	...	lb.	Dried figs, 2 ozs.; bread, $2\frac{1}{2}$ ozs.; flour, 4 ozs.; suet, 2 ozs.; sugar, 1 oz.; baking powder, approximately 1/10th oz.; water, a sufficiency.
Fish cakes	...	...	per person	Fish (cooked and free from skin and bone), 8 ozs.; mashed potatoes, 2 ozs.; margarine, 1 oz.
Fish paste	...	...	lb.	Fish (raw and boned), 1 lb.; rice, 1 oz.; margarine, 2 ozs.
Fish pie	...	...	lb.	Fish, $5\frac{1}{2}$ ozs. (free from skin and bone); fat $\frac{3}{4}$ oz.; potatoes (cooked and mashed); 8 ozs.; white sauce, $\frac{1}{4}$ pint; salt and pepper to taste.
Fish sauce (white sauce)			pint	Dripping, 1 oz.; milk, $\frac{1}{2}$ pint; flour, $1\frac{1}{2}$ ozs.; salt and vinegar to taste; water a sufficiency.
Fruit pudding	...	...	lb.	Fruit in season (fresh), 6 ozs.; flour, 5 ozs.; fat, $1\frac{1}{2}$ ozs.; sugar, 1 oz.; baking powder, salt and water, a sufficiency.
Fruit (stewed)	...	...	pint	Fruit in season, 16 ozs.; sugar, 3 ozs.; water, a sufficiency.
Galantine of beef	...	...	—	Two-thirds clods and stickings to one-third bread. NOTE.—The meat should be run through the "Hobart" machine with the finest plate, and the bread crumbed. There should be sufficient moisture from the meat; but if this is not the case a little water should be added to make a good mixture. Spice flavouring as desired. Boil in a cloth.
Ginger pudding	...	...	lb.	Preserved ginger, 2 ozs.; bread, $2\frac{1}{2}$ ozs.; flour, 4 ozs.; suet, 2 ozs.; sugar, 1 oz.; baking powder, approximately 1/10th oz.; water, a sufficiency.

INGREDIENT TABLE—*continued.*

Food.	Quantity.	Ingredients.
Golden pudding ...	lb.	Golden syrup or treacle, 2 ozs. ; bread, 2½ ozs. ; flour, 4 ozs. ; suet, 2 ozs. ; sugar, 1 ozs. ; baking powder, approximately 1/10th oz. ; water, a sufficiency.
Gruel	pint	Oatmeal, 2 oz. ; treacle, ½ oz. ; water and salt, a sufficiency ; allspice to be used occasionally.
Hot pot	pint	Meat (uncooked, free from bone), 5 ozs. ; onions, ¾ oz. ; potatoes, 8 ozs. ; fat, 1 oz. ; water, a sufficiency.
Hotchpotch	pint	Raw beef (free from bone), 4 ozs. ; flour, ¼ oz. ; peas, ¼ oz. ; scotch barley, ½ oz. ; carrots or turnips, 4 ozs. ; cabbage, 4 ozs. ; onion, 1 oz. ; pepper, salt and herbs to taste ; stock or water, a sufficiency.
Irish stew	pint	Neck of mutton (uncooked with bone), 5 ozs. ; or breast of mutton (uncooked), 4 ozs. ; potatoes, 2 ozs. ; onions, 1 oz. ; water, a sufficiency.
Jam or treacle roll ...	lb.	Flour, 8 ozs. ; jam or treacle, 2 ozs. ; suet, 2 ozs. ; water, a sufficiency.
Kedjeree	lb.	Any cold fish, free from skin and bone (dried haddock, good), 6 ozs. ; rice, ¼ lb. ; hard boiled egg (chopped) ; dripping or margarine, 2 ozs. ; salt and pepper to taste.
Macaroni cheese ...	per person	Macaroni, 1½ ozs. ; cheese, ½ oz. ; milk, 4 ozs. ; margarine, ⅙ oz.
Meat paste (potted meat)	per person	Meat, 1½ ozs. ; dripping, ⅙ oz. ; spices to taste.
Meat pie or pudding ...	1¼ lbs.	Meat (uncooked, without bone), 5 ozs. ; onions, ¾ oz. ; carrots, ¾ oz. ; potatoes, 8 ozs. ; flour, 4 ozs. ; suet or fat, 1 oz. ; water, a sufficiency.
Meat stew	pint	Meat (without bone, uncooked), 4 ozs. ; carrots, 2 ozs. ; turnips, 2 ozs. ; onions, 2 ozs. ; pearl barley, ½ oz. ; ground peas, ¼ oz. ; water, a sufficiency.
Milk puddings...	per patient	Rice, sago, tapioca, or semolina, 1 oz. ; sugar, ½ oz. ; milk, ½ pint.
Mince (savoury) ...	pint	Cooked meat, 8 ozs. ; or raw meat free from bone, 10 ozs. ; onions, 1 oz. ; bread, 2 ozs. ; dripping, 1 oz. ; meat liquor, ½ pint ; salt and pepper to taste.
Mutton broth	pint	Best end neck of mutton, 1 lb. ; pearl barley, ⅓ oz. ; water, a sufficiency.
Pease pudding	lb.	Split peas, 8 ozs. ; fat, ¼ oz. ; salt ; water or meat liquor, a sufficiency.
Porridge	pint	Oatmeal or rolled oats, 3 ozs. ; sugar, ½ oz. ; milk, 2½ ozs. ; water, a sufficiency.

NOTE.—It is desirable that the milk should be given cold, not mixed with the porridge.

INGREDIENT TABLE—*continued.*

Food.	Quantity.	Ingredients.
Potato pie	lb.	Raw beef free from bone, 5 ozs. ; fat, 1 oz. ; potatoes, 8 ozs. ; flour, 1 oz. ; onion, $\frac{1}{2}$ oz. ; meat liquor, $2\frac{1}{2}$ ozs. ; pepper and salt to taste.
Rabbit pie	$1\frac{1}{4}$ lbs.	Rabbit, 6 ozs. ; onions, $\frac{3}{4}$ oz. ; carrots, $\frac{3}{4}$ oz. ; potatoes, 8 ozs. ; flour, 4 ozs. ; suet or fat, 1 oz. ; water, a sufficiency.
Rabbit stew	pint	Rabbit, 5 ozs. ; carrots, 2 ozs. ; turnips, 2 ozs. ; onions, 2 ozs. ; pearl barley, $\frac{1}{2}$ oz. ; ground peas, $\frac{1}{4}$ oz. ; water, a sufficiency.
Raisin pudding	lb.	Raisins, 2 ozs. ; bread, $2\frac{1}{2}$ ozs. ; flour, 4 ozs. ; suet, 2 ozs. ; sugar, 1 oz. ; baking powder, approximately $\frac{1}{10}$ th oz. ; water, a sufficiency.
Rice and currants	lb.	Rice, $2\frac{1}{2}$ ozs. ; currants, $1\frac{1}{2}$ ozs. ; sugar, $\frac{1}{2}$ oz. ; milk, 5 ozs.
Rissoles	lb.	Meat, 9 ozs. ; suet or fat, $2\frac{1}{2}$ ozs. ; bread crumbs, $2\frac{1}{2}$ ozs. ; flour, 1 oz. ; onions, 1 oz. ; herbs and condiments to taste.
Salmon paste... ..	—	Tinned salmon, 10 lbs. ; margarine, 1 lb. ; rice, 5 ozs. NOTE. —Run through "Hobart" machine as for bloater paste.
Sausage (beef)	—	Lean beef, 9 lbs. ; fat beef, 3 lbs. ; bread, 4 lbs. ; seasoning, $\frac{1}{2}$ oz. to 1 lb. of meat. (Seasoning = salt, 1 lb. ; pepper, 6 ozs. ; nutmeg, $\frac{1}{2}$ oz. ; ginger, $\frac{1}{4}$ oz. ; mace, $\frac{1}{4}$ oz.)
Sausage (pork)	—	Lean pork, $9\frac{1}{2}$ lbs. ; fat pork, $2\frac{1}{2}$ lbs. ; bread, 3 lbs. ; seasoning, $\frac{1}{2}$ oz. to 1 lb. meat. (Seasoning = salt, 3 lbs. ; white pepper, 1 lb. ; nutmeg, 1 oz.) NOTE.—Cut up meat in "Hobart" machine, $\frac{1}{2}$ -inch plate. When meat is cut and mixed, put some back into "Hobart" feed pan and dust over with spices to secure even distribution. Follow this with a layer of damp bread spiced as before, then another layer of meat, spicing it, and so on until the pan is full. For second grinding use $\frac{3}{16}$ -inch plate, taking care that machine is fed equally with meat and bread. The mixture can then be cooked in bulk, or, if desired, put into skins with the appropriate fitting, and linked.
Savoury rice	—	Bacon fat, 8 ozs. ; rice, 6 lbs. ; onions (minced), 1 lb. ; chopped parsley, 2 ozs. ; stock or water, 12 quarts.

INGREDIENT TABLE—*continued.*

Food.	Quantity.	Ingredients.
Shepherd's pie ...	lb.	Cold cooked meat (free from bone), 4 ozs. ; fat, $\frac{1}{2}$ oz. ; cold cooked potatoes (mashed), 12 ozs. ; onion, $\frac{1}{2}$ oz. ; gravy or stock, 1 oz. ; pepper and salt to taste.
Soup (meat) ...	pint	Raw beef (free from bone), 3 ozs. ; bones, 2 ozs. ; split peas, 2 ozs. ; haricot beans, 1 oz., or scotch barley, 1 oz. ; or lentils, 2 ozs. ; oatmeal or flour, $\frac{1}{2}$ oz., vegetables, 1 oz. ; salt, pepper and herbs to taste ; water, a sufficiency.
Smoked herring roll ...	—	Minced smoked herrings (free from skin and bone), 7 lbs. ; cooked haricot beans (minced), $2\frac{1}{2}$ lbs. ; raw potatoes, 8 lbs. ; ground rice, 1 lb. ; parsley, vinegar and pepper to taste.
Soup (pea) ...	pint	Raw beef (free from bone), 3 ozs. ; bones, 2 ozs. ; ground peas, 2 ozs. ; oatmeal, $\frac{1}{2}$ oz. ; vegetables, 1 oz. ; salt, pepper and herbs to taste ; water, a sufficiency.
Soup (vegetable) ...	pint	Peas or lentils, 1 oz. ; or pearl barley, $\frac{1}{2}$ oz. ; sago, $\frac{1}{2}$ oz. ; ground peas, $\frac{1}{4}$ oz. ; onions, $1\frac{1}{2}$ ozs. ; carrots, $1\frac{1}{2}$ ozs. ; turnips, $1\frac{1}{2}$ ozs. ; stock and water, a sufficiency.
Suet pudding ...	lb.	Flour, 9 ozs. ; suet, $1\frac{1}{2}$ ozs. ; salt to taste ; water, a sufficiency.
Treacle pudding ...	—	<i>See golden pudding.</i>
Tripe and onions ...	per person	Tripe, 4 ozs. ; onions, 4 ozs. ; milk, 1 oz. ; water, a sufficiency.

APPENDIX G.

REPORT ON SOME MATTERS CONCERNING KITCHEN EQUIPMENT
IN CANADIAN AND AMERICAN HOSPITALS.

BY STANLEY J. BENHAM.

64 & 66, WIGMORE STREET,
LONDON, W.1.THE CHAIRMAN,
DIETARIES COMMITTEE,
THE BOARD OF CONTROL.

SIR,

In accordance with your request, I visited Manhattan State Hospital on Monday, 14th May, and saw Dr. Raynor, senior assistant to Dr. Heyman, and was handed over by him to the chief chef, who rendered me valuable assistance.

The hospital has at present 6,700 inmates, and formerly had 7,500. There are eight kitchens, and a conveyance was provided to take us round to four of them, including the largest one, which provides for 2,200 persons.

I did not find the equipment at all impressive, the reason given to me being that the buildings were old, and had been taken over by the State from the Central Government. There was no gas available, and each kitchen was fitted with a central coal hot plate, with hood over. In the largest kitchen this was augmented by a portable independent baker's oven, of the type of a Rhodes oven, without steam tubes. Potatoes, vegetables, meat and soup are all boiled in seven 100-gallon aluminium boiling pans, which they spoke highly of, and which showed very few signs of deterioration after nine years' use. The steam ovens are used only for puddings, and are inferior to the best British makes. For dish-washing they had just placed an order for three large dish-washing machines of the spraying type, the kind used in practically every institution of every kind in the States and Canada. The working tables were never of wood, some being of wrought steel, and the more recent ones of monel metal, which I was told lasts for ever, and needs practically no cleaning.

I asked about trolleys, and found they use unheated trolleys for transit, and have steam hot closets in the wards. This question is troubling them considerably, as they have long underground passages in some cases, and the food suffers accordingly. They are considering the use of trolleys with vacuum casings.

They advised me that it would be of little use for me to visit Brooklyn State Hospital, but suggested Poughkeepsie. As, however, this was 75 miles from New York, I could not spare the time.

Before leaving New York I also visited three general hospitals—St. Luke's Hospital, Fifth Avenue Hospital, and Mount Sinai Hospital. The equipment of the first named was altogether out of date, but the two latter were quite modern. At the Fifth Avenue Hospital the most noticeable items were the dish-washer, which was again of the spraying type, and the "Gotham" trolleys, which were electrically heated by flexible connections with wall plugs in the kitchen, and again in the wards.

These trolleys, of which I enclose a photograph, appeared to be serving their purpose admirably. The body of the trolley is constructed of aluminium, or white stove enamelled mild steel, built up on an angle iron framework. To conserve heat the ends of the trolley are double-cased and heavily insulated, and specially constructed double-cased doors are provided, which are packed with silicate cotton. All wheels are fitted with ball bearings, and arranged so that the trolley can be turned in its own length. The contents of the trolley are kept hot by concealed electric elements placed centrally and at both ends, and while the elements are easily renewable their natural life need cause no anxiety. A length of flexible wire emanates from an enclosed conduit from underneath the trolley for wall plug connections. The temperature is low, and therefore the longevity of the elements is great.

At this hospital it is the custom to serve each patient's meal on a separate tray in the kitchen, which, when ready, is placed in the trolley for transit to wards. Each trolley takes 24 trays, which necessitates many shelves. The trolley, therefore, with its present internal fittings, would be useless for ordinary mental hospital work; but an entire change in fittings could be made to suit requirements, without any change in external construction or heating principle. I think so highly of its possibilities that I propose myself designing a modification that would meet all British mental hospital requirements.

There was no woodwork in the Fifth Avenue Hospital kitchen at all, all tables and fittings being constructed of mild steel.

In the Mount Sinai Hospital the hot closets were all mounted on legs, and I found afterwards that this is generally being adopted in the States to give facilities for cleaning. The store cupboards and drawers in the kitchen were all constructed of steel or monel, and the tables of monel metal: they consider metal to be much cleaner than wood.

On arrival at Boston I at once called upon Dr. Kline, at the State House, and he was most interested to help me. In the afternoon he motored me to the Boston State Hospital, where they have two large kitchens, each with dining rooms adjoining. One kitchen cooked for 1,200 persons and there was no woodwork in it, only two steel tables, each 8 ft. long. Dr. Kline considers that it is best to dispense with all woodwork in kitchen, dining room and toilet. For serving in the infirmary they had round, heavily insulated food containers, each 12 ins. diameter by 10 ins. deep inside, with 2 ins. of cork insulation, the inside being aluminium and the outside monel metal.

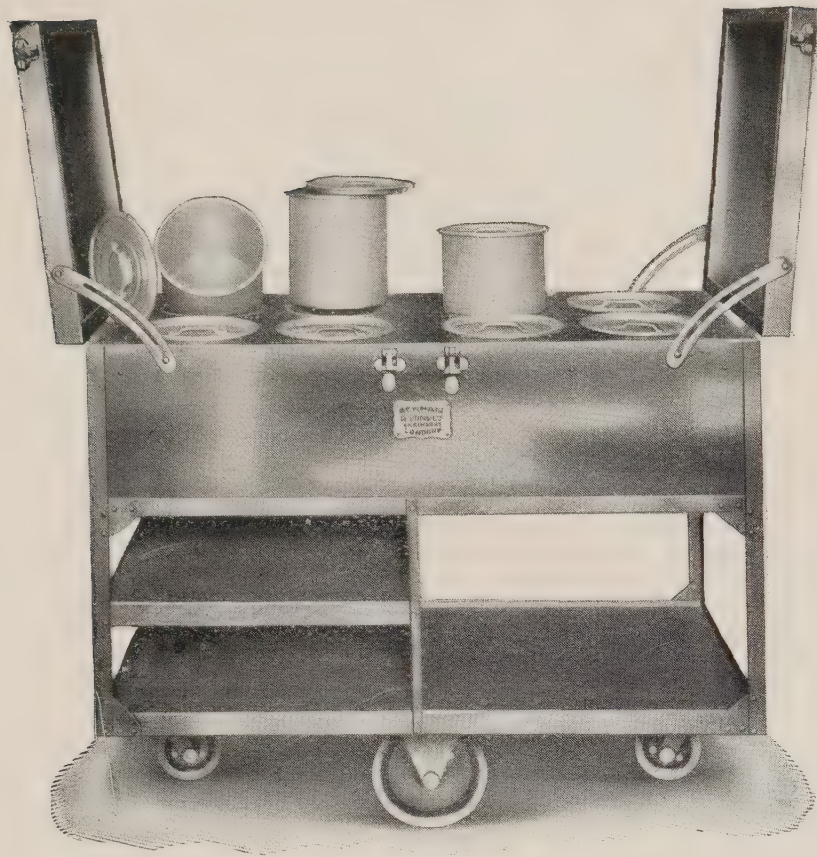
Dr. Kline advised me that in his opinion the model institution in the whole of the United States was the Foxborough State Hospital, 25 miles from Boston. The medical superintendent, Dr. Thomas, to whom he introduced me, happened to be in Boston, and motored me out there next day. It was certainly a great advance on anything else I had seen in America. They have at present 600 patients, but are building extensions for a total of 1,000.

They have a very fine dining hall at Foxborough, fitted with oblong tables at each of which six patients sit. The kitchen is immediately adjoining, and is fitted with a central coal range, aluminium boiling pans, cast-iron steam ovens, and an aluminium tea-making apparatus. They have also cast-iron steam-jacketed pans, in which they roast meat, bake beans, etc., with a steam pressure of 35 lbs. per square inch. All the food is served to the patients in insulated trolleys, each 4 ft. by 2 ft. 6 ins., fitted with 8-quart aluminium containers. Each trolley serves eight tables (48 inmates), so they have no hot closets in either the kitchen or dining room (query, other than for warming plates). I understand that the insulation is so perfect that food can be kept for hours without loss of temperature or deterioration.

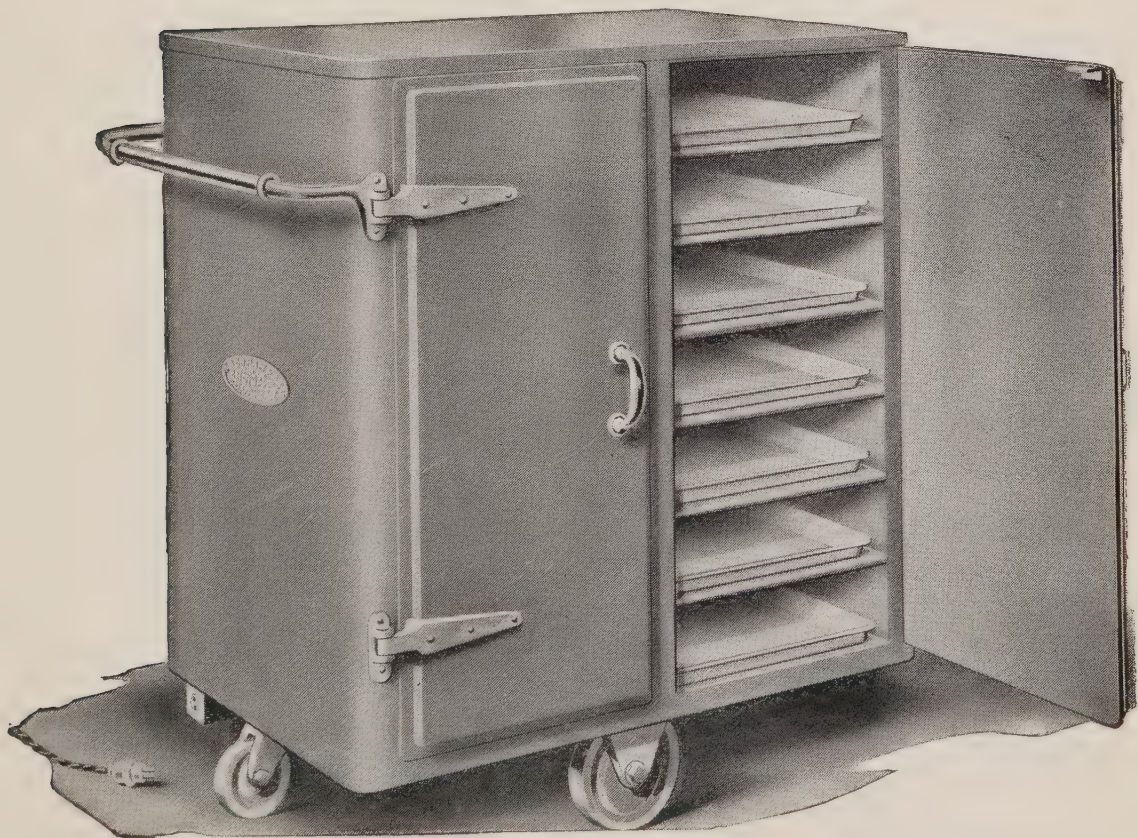
As this appeared to be exactly the sort of transport arrangement you require, I paid special attention to details of construction. In principle it closely resembles the thermos flask, inasmuch as it maintains the food at various temperatures, both hot and cold, and, owing to the manner in which it is designed, liquids cannot be spilt in transit. The body is constructed either of monel metal—which is rustless, stainless, and practically everlasting—or of mild steel, stove or white enamelled outside. It is mounted on four rubber-tyred wheels, two of which are bogey wheels, and all are fitted with ball-bearings. It is easily negotiated and can completely turn in its own length. There are six or eight food containers of aluminium, the capacity of each being 6 quarts. The whole is of sufficiently light structure to ensure durability and ease of manipulation, and it is thoroughly well insulated. It is possible to fill adjacent containers with hot soup and ice, respectively, without detriment to the temperature of either. With a view to testing more exactly, I filled each container with water at 165° F., and temperatures were taken at the end of one, two and three hours. The loss of heat (9° in the first hour, 5½° in the second, and 4° in the third) showed the perfection of the insulation. I enclose a photograph of this trolley for your information.

Although I consider the electrically heated trolley a marked advance over hot-water jacketed trolleys, or anything now in regular use in English mental hospitals, I regard this Foxborough trolley as better still. It is more sturdy and

THE "FOXBOROUGH" INSULATED TROLLEY.



THE "GOTHAM" ELECTRICALLY-HEATED TROLLEY.



consequently less liable to damage, has no delicate parts, can easily be kept clean and in good sanitary condition, is light and easy of manipulation, and is efficient. If food is hot when placed in it, there will be practically no loss of temperature in the short time elapsing between leaving kitchen and service in wards.

As with the electrical trolley it is probable that, for county mental hospital use in England, modifications of this one will be necessary also ; but this is a mere matter of detail. I am, in fact, asking my firm to supply you with a design for a special adaptation containing four containers of the correct size for a ward of 50 patients ; one container for meat, one for potatoes, one for greens, and one for puddings, the whole to be insulated in the same manner as the Foxborough trolley. (*See page 124.*)

I have not entered into any details concerning the dish-washing machine, as I gather it is rather outside your present inquiry, but I will repair the omission should you desire it.

As in other institutions all the tables and bins in the kitchen and stores at Foxborough are made of metal.

I was not able to call at either of the other institutions on your list, but I visited the Toronto General Hospital and the Montreal General Hospital without seeing anything worthy of special comment.

The matters during my visit that have impressed me as being of most importance to you have been :—

(1) The almost entire substitution of metal for wood in all kitchen fittings—aluminium, mild steel, or monel metal being chiefly used. The last-named is gaining ground on account of its stainlessness, and the facility with which it can be cleaned.

(2) The general employment of dish-washers on the score of cleanliness, rapidity and economy in breakages, notwithstanding the apparent plentitude of hand labour.

(3) The electrically-heated trolley, which is of admirable design, and

(4) The Foxborough insulated trolley, which in my opinion should meet all your requirements for food transport purposes.

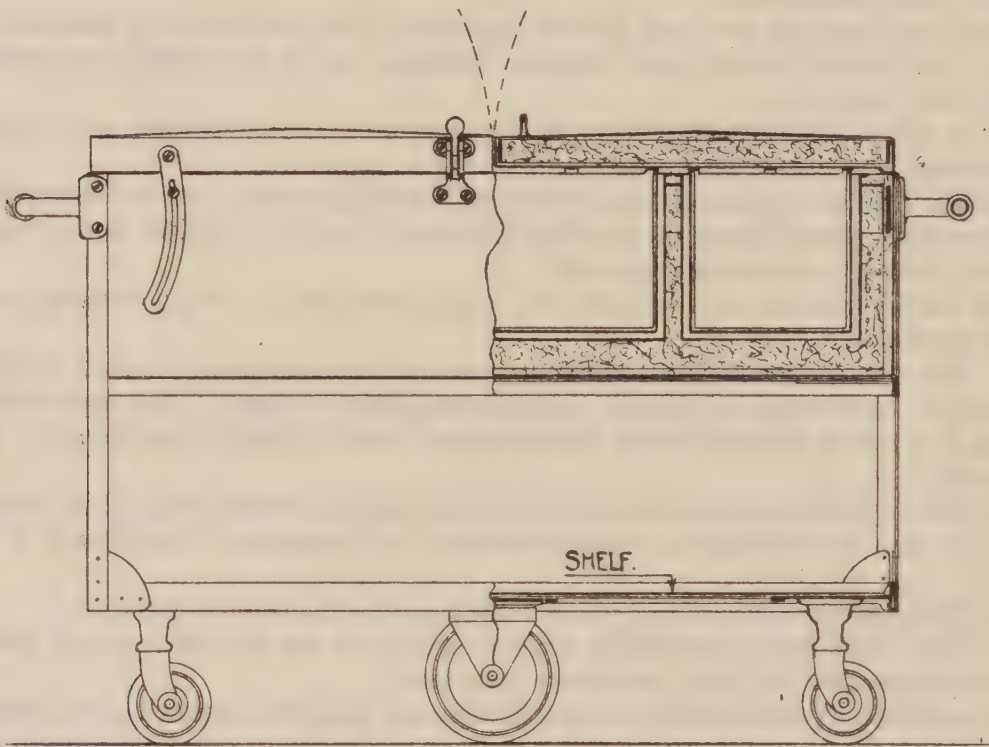
In conclusion I should like to acknowledge my indebtedness to those gentlemen who assisted me in my investigations, with special reference to the valuable help I received from Dr. Kline of Boston and Dr. Thomas, the medical superintendent of the Foxborough State Hospital.

I am, sir,

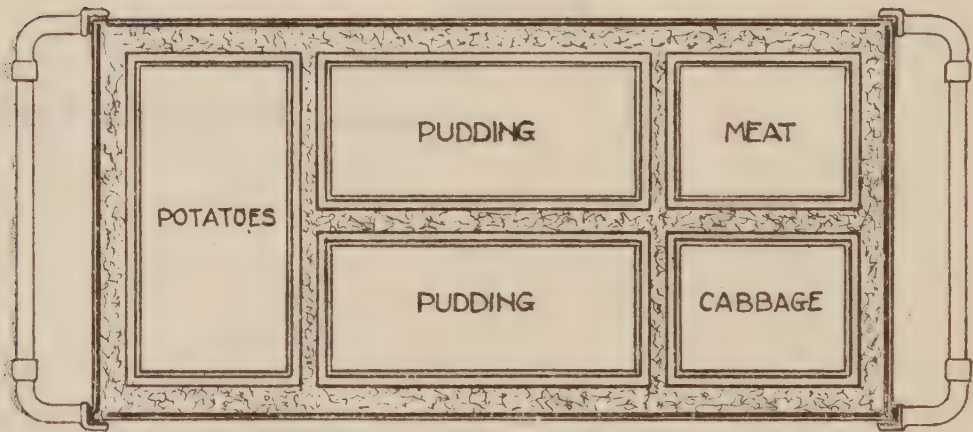
Yours faithfully,

(*Signed*) STANLEY J. BENHAM.

BENHAM'S SUGGESTED MODIFICATION OF THE "FOXBOROUGH" INSULATED
TROLLEY FOR USE IN MENTAL HOSPITALS.



EXTERNAL ELEVATION. SECTIONAL ELEVATION.



SECTIONAL PLAN.

Average quantities of provisions required to feed 100 patients (50 males and 50 females) for one week, as per suggested dietary scale attached. Please insert the cost at your institution at current prices. The quantities must not be altered in any way.

Quantity.		Description.	Price.	Cost.		Value of various groups as ruled.		Description.	Price.	Cost.		Value of various groups as ruled.	
Lbs.	Ozs.			£	s.	£	s.			£	s.	£	s.
81	13½	Beef	....					Brought forward	....			
21	1½	Mutton	....					Greens	....			
14	1	Pork	....					Other vegetables (see Note "D")	....			
16	8	Rabbits	....					Tea (see Note "B")	....			
		See Note.						Coffee (see Note "A")	....			
6	4	"C" Galantine (beef)	....					Cocoa (see Note "A")	....			
6	4	"C" Brawn (beef)	....									
6	4	Veal loaf	....					Milk	....			
6	4	"C" Breakfast sausage	....					Gall ons.	....			
6	4	Corned beef	....					43 Lbs.	....			
								81 Lbs.	....			
10	9	Bacon	....					Sugar	....			
20	7½	Suet	....					Pearl Barley	....			
46	14	Fish	....					Lentils	....			
6	4	Fish Cakes	....					Split peas	....			
11	....	"C" Fish paste	....					Sago	....			
								Rice	....			
518	12	Bread	....					Tapioca	....			
54	4	Margarine	....					Baking powder	....			
220	8	Potatoes	....					Curry powder	....			
10	15	Raisins	....					Haricot beans	....			
10	3	Currants	....					Flour	....			
4	12	Sultanas	....					Oatmeal	....			
1	9	Dates	....					Jam	....			
		Carried forward	£					Golden syrup	....			
								Cost per patient (to two places of decimals)	....			
								Total Cost	....			

NOTES.

"A"—For the purposes of this return only, it is assumed that coffee and cocoa will be supplied alternately for breakfast.

"B"—For the purposes of this return only, it is assumed that tea will be supplied daily for tea meal.

"C"—The cost of these articles shall be that of making in the hospital. If this is not possible, the cost of purchase shall be inserted, and marked accordingly, "P."

"D"—Other vegetables to be calculated as follows: Onions, 38½ lbs.; carrots, 43½ lbs.; turnips, 25 lbs.; parsnips, 4½ lbs.; total, 111 ⅔ lbs.

STATEMENT SHEWING THE ESTIMATED COST PER WEEK OF THE SUGGESTED DIETARY FOR 100 PATIENTS (50 MALE, 50 FEMALE) IN 95 MENTAL HOSPITALS, BASED ON THE QUANTITIES SHOWN IN FOREGOING SCHEDULE.

Name of Mental Hospital.	Meats.	Bacon.	Suet.	Fish.	Bread.	Margarine.	Potatoes.	Dried fruits.	Vegetables.	Beverages.	Milk.	Sugar.	Cereals.	Jam, &c.	Total.	Cost per head per day.
Plymouth	£ 7 12 7	£ 0 9 7	£ 0 18 10	£ 2 14 3	£ 5 3 8	£ 4 14 11	£ 0 7 10	£ 0 15 1	£ 0 14 7	£ 1 13 2	£ 3 18 10	£ 1 15 9	£ 2 0 1	£ 0 15 1	£ 1 33 17	11.62
Northumberland	£ 7 15 9	£ 0 11 10	£ 0 10 3	£ 3 4 9	£ 4 17 3	£ 1 7 1	£ 0 9 22	£ 1 7 0	£ 0 14 10	£ 1 13 2	£ 3 5 0	£ 1 14 0	£ 1 13 9	£ 0 15 0	£ 1 32 14	11.21
Middlesbrough	£ 7 6 9	£ 0 11 5	£ 0 15 4	£ 2 19 7	£ 4 6 6	£ 1 18 5	£ 0 10 10	£ 0 14 2	£ 2 5 11	£ 2 3 5	£ 3 11 8	£ 1 16 5	£ 1 14 2	£ 0 13 0	£ 1 32 1	10.99
London (City of)	£ 7 4 2	£ 0 10 6	£ 0 6 1	£ 1 8 9	£ 4 4 10	£ 3 12 4	£ 0 9 22	£ 1 2 5	£ 1 6 11	£ 1 18 1	£ 1 15 10	£ 2 7 8	£ 1 14 2	£ 0 16 0	£ 1 31 15	10.89
Denbigh	£ 5 19 11	£ 0 8 6	£ 0 10 3	£ 1 13 8	£ 4 6 5	£ 1 5 5	£ 0 8 0	£ 0 19 9	£ 2 5 10	£ 1 18 7	£ 3 11 8	£ 1 16 6	£ 1 13 5	£ 0 14 0	£ 1 28 11	9.80
Yorks (Wadsley)	£ 6 17 7	£ 0 8 3	£ 0 13 5	£ 1 13 8	£ 4 6 5	£ 1 5 5	£ 0 8 0	£ 0 19 9	£ 2 5 10	£ 1 18 7	£ 3 11 8	£ 1 16 6	£ 1 13 5	£ 0 14 0	£ 1 28 11	9.76
Durham	£ 6 13 6	£ 0 10 6	£ 0 13 5	£ 1 13 8	£ 4 6 5	£ 1 5 5	£ 0 8 0	£ 0 19 9	£ 2 5 10	£ 1 18 7	£ 3 11 8	£ 1 16 6	£ 1 13 5	£ 0 14 0	£ 1 28 11	9.71
Somerset (Wells)	£ 7 5 1	£ 0 10 7	£ 0 13 8	£ 3 2 9	£ 4 6 6	£ 1 7 1	£ 0 9 2	£ 1 2 4	£ 0 17 0	£ 1 12 9	£ 1 15 10	£ 2 4 3	£ 1 16 10	£ 0 15 0	£ 1 28 6	9.65
Cumberland	£ 7 1 4	£ 0 9 1	£ 0 10 3	£ 1 7 3	£ 4 6 6	£ 1 4 8	£ 0 9 10	£ 0 19 10	£ 0 7 3	£ 1 17 7	£ 2 17 4	£ 1 18 3	£ 1 14 3	£ 0 11 0	£ 1 27 16	9.53
Hull	£ 7 9 5	£ 0 9 7	£ 1 0 6	£ 0 16 7	£ 4 6 6	£ 1 4 2	£ 0 7 11	£ 0 15 4	£ 1 1 2	£ 1 12 11	£ 4 6 0	£ 1 14 7	£ 1 11 3	£ 0 18 0	£ 1 27 10	9.43
Yorks (N.R.)	£ 5 4 5	£ 0 10 7	£ 1 4 4	£ 4 5 10	£ 3 4 10	£ 1 19 0	£ 0 19 8	£ 0 14 9	£ 1 1 4	£ 1 12 11	£ 4 6 0	£ 1 14 7	£ 1 11 3	£ 0 18 0	£ 1 27 10	9.27
Essex (Brentwood)	£ 5 13 3	£ 0 9 5	£ 0 10 3	£ 3 10 0	£ 4 6 6	£ 1 3 9	£ 0 13 9	£ 0 18 0	£ 2 2 3	£ 1 6 0	£ 3 11 8	£ 1 19 0	£ 1 16 3	£ 0 10 0	£ 1 26 18	9.24
Dorset	£ 5 19 9	£ 0 11 4	£ 0 10 3	£ 1 4 10	£ 4 6 6	£ 1 3 9	£ 0 13 9	£ 0 18 0	£ 2 2 3	£ 1 6 0	£ 3 11 8	£ 1 19 0	£ 1 16 3	£ 0 10 0	£ 1 26 18	9.03
Isle of Wight	£ 7 11 2	£ 0 8 6	£ 0 17 1	£ 1 4 9	£ 3 12 11	£ 1 7 10	£ 0 17 9	£ 1 10 1	£ 0 4 0	£ 1 12 7	£ 4 6 0	£ 1 17 5	£ 1 14 11	£ 0 9 0	£ 1 26 6	8.98
Brecon	£ 5 16 11	£ 0 8 10	£ 0 11 3	£ 1 18 7	£ 4 6 5	£ 1 5 4	£ 0 7 11	£ 0 18 5	£ 1 17 11	£ 1 10 7	£ 3 11 8	£ 2 0 10	£ 1 10 5	£ 0 8 0	£ 1 25 17	8.97
Gateshead	£ 6 4 3	£ 0 9 2	£ 0 17 1	£ 1 5 4	£ 4 6 5	£ 1 5 4	£ 0 7 11	£ 0 18 5	£ 1 17 11	£ 1 10 7	£ 3 11 8	£ 2 0 10	£ 1 10 5	£ 0 8 0	£ 1 25 17	8.94
Leicester Co.	£ 7 1 5	£ 0 9 8	£ 0 18 9	£ 1 15 5	£ 4 6 5	£ 1 6 7	£ 0 6 10	£ 0 15 3	£ 0 11 9	£ 1 12 3	£ 4 6 5	£ 2 2 2	£ 1 15 5	£ 0 8 0	£ 1 25 10	8.89
Glamorgan	£ 6 5 2	£ 0 9 9	£ 0 18 8	£ 1 15 5	£ 4 6 5	£ 1 6 7	£ 0 6 10	£ 0 15 3	£ 0 11 9	£ 1 12 3	£ 4 6 5	£ 2 2 2	£ 1 15 5	£ 0 8 0	£ 1 25 10	8.87
Canterbury	£ 5 12 5	£ 0 8 1	£ 0 9 5	£ 1 16 8	£ 3 15 8	£ 1 4 9	£ 0 9 22	£ 0 15 0	£ 0 17 11	£ 1 10 3	£ 4 0 8	£ 2 2 2	£ 1 18 4	£ 0 9 0	£ 1 25 10	8.75
Oxford	£ 5 18 3	£ 0 11 3	£ 0 12 10	£ 1 19 11	£ 3 4 10	£ 1 8 5	£ 0 9 22	£ 0 14 5	£ 0 8 1	£ 1 2 0	£ 3 11 8	£ 1 19 2	£ 1 13 10	£ 0 14 0	£ 1 25 9	8.72
Portsmouth	£ 4 15 7	£ 0 12 4	£ 0 11 4	£ 3 7 9	£ 4 10 1	£ 1 5 5	£ 0 6 5	£ 1 3 3	£ 0 7 5	£ 1 15 6	£ 3 11 8	£ 1 18 0	£ 1 13 3	£ 0 14 0	£ 1 25 7	8.70
Nottingham City	£ 5 11 7	£ 0 10 8	£ 0 12 10	£ 2 10 5	£ 4 6 5	£ 1 5 5	£ 0 7 11	£ 0 15 7	£ 0 13 10	£ 1 8 2	£ 2 10 2	£ 1 19 0	£ 1 15 3	£ 0 8 0	£ 1 25 3	8.69
Kent Co. (Barming Heath)	£ 5 16 1	£ 0 10 7	£ 0 13 8	£ 2 3 6	£ 3 15 8	£ 1 8 1	£ 0 4 7	£ 0 17 5	£ 0 13 10	£ 1 10 11	£ 4 6 0	£ 1 17 5	£ 1 12 0	£ 0 12 0	£ 1 25 2	8.63
Hereford Co. and City	£ 6 17 7	£ 0 11 8	£ 0 13 11	£ 1 19 3	£ 4 10 1	£ 1 3 3	£ 0 6 0	£ 0 14 6	£ 0 16 6	£ 1 13 2	£ 3 11 8	£ 1 17 11	£ 1 12 0	£ 0 16 0	£ 1 24 19	8.59
Cambridge Co.	£ 6 17 2	£ 0 7 11	£ 0 13 8	£ 1 15 5	£ 4 6 5	£ 1 3 3	£ 0 6 0	£ 0 14 6	£ 0 16 6	£ 1 13 2	£ 3 11 8	£ 1 17 11	£ 1 12 0	£ 0 16 0	£ 1 24 19	8.57
Beds., Herts and Hunts	£ 5 18 11	£ 0 11 2	£ 0 13 0	£ 1 15 5	£ 4 6 5	£ 1 3 3	£ 0 6 0	£ 0 14 6	£ 0 16 6	£ 1 13 2	£ 3 11 8	£ 1 17 11	£ 1 12 0	£ 0 16 0	£ 1 24 19	8.54
Yorks (E.R.)	£ 5 16 9	£ 0 11 6	£ 0 13 1	£ 1 15 5	£ 4 6 5	£ 1 3 3	£ 0 6 0	£ 0 14 6	£ 0 16 6	£ 1 13 2	£ 3 11 8	£ 1 17 11	£ 1 12 0	£ 0 16 0	£ 1 24 19	8.50
Newport	£ 5 18 11	£ 0 11 2	£ 0 13 0	£ 1 15 5	£ 4 6 5	£ 1 3 3	£ 0 6 0	£ 0 14 6	£ 0 16 6	£ 1 13 2	£ 3 11 8	£ 1 17 11	£ 1 12 0	£ 0 16 0	£ 1 24 19	8.42
Carmarthen	£ 4 12 11	£ 0 11 0	£ 0 13 0	£ 1 15 5	£ 4 6 5	£ 1 3 3	£ 0 6 0	£ 0 14 6	£ 0 16 6	£ 1 13 2	£ 3 11 8	£ 1 17 11	£ 1 12 0	£ 0 16 0	£ 1 24 19	8.42
West Sussex	£ 5 16 9	£ 0 11 6	£ 0 13 1	£ 1 15 5	£ 4 6 5	£ 1 3 3	£ 0 6 0	£ 0 14 6	£ 0 16 6	£ 1 13 2	£ 3 11 8	£ 1 17 11	£ 1 12 0	£ 0 16 0	£ 1 24 19	8.37
Yorks (Wakefield)	£ 5 16 9	£ 0 11 6	£ 0 13 1	£ 1 15 5	£ 4 6 5	£ 1 3 3	£ 0 6 0	£ 0 14 6	£ 0 16 6	£ 1 13 2	£ 3 11 8	£ 1 17 11	£ 1 12 0	£ 0 16 0	£ 1 24 19	8.36
Exeter City	£ 5 15 6	£ 0 10 9	£ 0 13 0	£ 1 19 0	£ 4 6 6	£ 1 4 2	£ 0 5 11	£ 0 19 10	£ 0 17 11	£ 1 15 7	£ 2 10 2	£ 2 2 0	£ 1 14 8	£ 0 13 0	£ 1 24 6	8.33
Essex (Severalls)	£ 4 16 9	£ 0 6 10	£ 0 12 9	£ 0 19 0	£ 4 6 6	£ 1 6 9	£ 0 7 11	£ 1 0 4	£ 0 15 5	£ 1 15 7	£ 2 10 2	£ 2 2 0	£ 1 14 8	£ 0 13 0	£ 1 24 6	8.26
Derby Boro.	£ 4 17 2	£ 0 10 7	£ 0 11 11	£ 0 14 1	£ 4 6 6	£ 1 4 10	£ 0 9 22	£ 1 0 4	£ 0 17 11	£ 2 7 1	£ 3 4 6	£ 1 14 1	£ 1 11 1	£ 0 9 0	£ 1 23 19	8.21
Monmouth	£ 5 0 4	£ 0 11 0	£ 0 10 3	£ 1 17 6	£ 4 1 1	£ 1 4 2	£ 0 6 11	£ 0 16 3	£ 0 14 8	£ 1 14 10	£ 3 3 17	£ 0 1 7	£ 1 11 3	£ 0 9 0	£ 1 23 18	8.20
Sunderland	£ 4 18 9	£ 0 11 1	£ 0 15 4	£ 1 14 11	£ 3 15 8	£ 1 5 5	£ 0 6 11	£ 0 17 1	£ 0 15 1	£ 1 11 10	£ 4 6 0	£ 1 16 6	£ 2 2 0	£ 0 7 0	£ 1 23 16	8.17
Newcastle	£ 6 9 11	£ 0 7 9	£ 0 17 1	£ 2 7 10	£ 4 6 6	£ 1 6 2	£ 0 6 11	£ 0 15 1	£ 0 12 8	£ 1 11 13	£ 3 11 8	£ 1 16 6	£ 2 2 0	£ 0 7 0	£ 1 23 15	8.15
Hants (Park Prewett)	£ 3 19 4	£ 0 8 10	£ 0 10 3	£ 1 7 8	£ 4 10 1	£ 1 12 9	£ 0 6 5	£ 0 14 1	£ 0 6 5	£ 1 8 10	£ 3 4 6	£ 1 19 2	£ 1 16 6	£ 0 12 0	£ 2 23 13	8.12
Ipswich	£ 4 3 3	£ 0 9 0	£ 0 7 0	£ 1 10 1	£ 3 4 4	£ 1 4 11	£ 0 9 2	£ 1 1	£ 0 7 6	£ 1 10 1	£ 4 6 0	£ 1 17 5	£ 1 10 1	£ 0 10 0	£ 2 23 12	8.09
Worcester Co. (Powick)	£ 4 3 3	£ 0 9 0	£ 0 7 0	£ 1 10 1	£ 3 4 4	£ 1 4 11	£ 0 9 2	£ 1 1	£ 0 7 6	£ 1 10 1	£ 4 6 0	£ 1 17 5	£ 1 10 1	£ 0 10 0	£ 2 23 12	8.09
Herts Co.	£ 4 3 3	£ 0 9 0	£ 0 7 0	£ 1 10 1	£ 3 4 4	£ 1 4 11	£ 0 9 2	£ 1 1	£ 0 7 6	£ 1 10 1	£ 4 6 0	£ 1 17 5	£ 1 10 1	£ 0 10 0	£ 2 23 12	8.09
Staffs (Burntwood)	£ 4 3 3	£ 0 9 0	£ 0 7 0	£ 1 10 1	£ 3 4 4	£ 1 4 11	£ 0 9 2	£ 1 1	£ 0 7 6	£ 1 10 1	£ 4 6 0	£ 1 17 5	£ 1 10 1	£ 0 10 0	£ 2 23 12	8.09
Yorks (Menston)	£ 4 3 3	£ 0 9 0	£ 0 7 0	£ 1 10 1	£ 3 4 4	£ 1 4 11	£ 0 9 2	£ 1 1	£ 0 7 6	£ 1 10 1	£ 4 6 0	£ 1 17 5	£ 1 10 1	£ 0 10 0	£ 2 23 12	8.09

[illegible]

ANALYSIS OF THE FOREGOING TABLE.

Showing variations in the estimated cost of each food group.

As the returns show such variation a brief analysis seems desirable. The following summary shows the cost under each heading :

Meats.—

From	...	70s.	81s.	91s.	101s.	111s.	121s.	141s.
To	...	80s.	90s.	100s.	110s.	120s.	140s.	192s.
No. of Hospitals		8	13	31	12	11	10	10

Therefore about 55 per cent. of hospital authorities can supply the amount of meat required for 100 patients for one week for £5 or under, a figure that may be considered a reasonable one, when large quantities are purchased by contract. Meat consumed by patients is for the most part imported, although cattle and pigs from hospital farms are slaughtered for consumption with varying frequency. A closer examination of the cost of meat shows that of beef to vary from $3\frac{1}{2}d.$ per lb. to $1s. 4d.$ per lb., pork from $8d.$ to $2s.$ per lb., and mutton from $6\frac{1}{2}d.$ to $1s. 6d.$ per lb. These figures are so diverse that it seems possible that some of the higher prices may be due to the market purchase of English meat, which, in view of the excellent quality of the modern imported variety, is difficult to justify. As the cost of meat purchased would depend greatly upon the terms of the schedule or specification on which the contract is based, visiting committees should consider how their hospital contract schedules compare with the specimen on page 97 of this report. An alteration in the terms of their particular schedules may be desirable in the interest of efficiency and economy. All meat supplied from home farms should be invoiced to institutions at current local market rates, *i.e.*, at the prices quoted at the nearest market to the hospital, as recorded in the "Agricultural Market Report," published weekly by the Ministry of Agriculture and Fisheries.

Bacon.—The cost of bacon does not show such extreme variation, although here again in two or three instances the price charged is nearly, or more than, doubled; the analysis being as follows :—

Estimated cost	...	7s.	8s.	9s.	10s.	11s.	12s.	13s.	15s.
No. of Hospitals	...	9	11	23	19	25	5	2	1

The cost per lb. varies from $7\frac{1}{2}d.$ to $1s. 4\frac{3}{4}d.$ The amount of bacon required was provided in 65 per cent. of institutions for $10s.$ or under.

Suet.—The price of this article varies :—

From	...	...	6s.	11s.	16s.	21s.
To	...	...	10s.	15s.	20s.	26s.
No. of Hospitals	...	...	42	32	13	8

If a large proportion of institutions can provide the amount required for $10s.$, and 75 per cent. for $15s.$ or under, the larger sums cannot be justified. The lowest cost of suet is shown at $4d.$ per lb. and the highest at $1s. 3d.$ The remarks made above with reference to the desirability of revising meat contract schedules, apply here also with equal force. The provision of a Hobart machine for home shredding would lead to saving that would pay for the cost of its installation in a comparatively short period of time.

Fish.—Cost varies :—

From	...	...	12s.	21s.	31s.	41s.	61s.
To	...	...	20s.	30s.	40s.	60s.	86s.
No. of Hospitals	...	...	15	48	17	9	6

Here again there is difficulty in explaining the marked differences that exist. Probably the distance of some hospitals from towns and recognised fishing ports is to some extent responsible ; but freightage should not account for a difference between $2\frac{1}{2}d.$ in one instance and 1s. per lb. in another. Hospital contract schedules should be compared with the specimen printed on page 00, to see whether any improvement can be effected.

Bread.—Cost varies :—

From	...	...	49s.	61s.	71s.	81s.	91s.
To	...	...	60s.	70s.	80s.	90s.	130s.
No. of Hospitals	...	...	23	36	11	18	7

Bread, with very few exceptions, is made in hospital bakeries. As the price of flour is more or less uniform it is difficult to understand the differences in cost disclosed. In all probability the methods adopted for ascertaining the cost of bread made on hospital premises need revision. The publication of these figures will, it is hoped, result in this being done. The cost per lb. apparently varies from $1\frac{1}{8}d.$ to $3d.$ At the time these figures were obtained one large mental hospital was purchasing bread from outside sources at $1\frac{1}{2}d.$ per lb. If 62 per cent. of mental hospitals can provide the amount of bread required for 70s. or under, the higher rates quoted by others call for explanation.

Margarine.—Cost varies :—

From	...	...	23s.	26s.	31s.	36s.	42s.	72s.	95s.
To	...	...	25s.	30s.	35s.	40s.	—	—	—
No. of Hospitals	...	...	60	23	2	7	1	1	1

Although not so stated, the last two of the above figures possibly include the purchase of some butter. The difference in the cost of margarine is doubtless due to the quality contracted for, depending largely upon whether it is made from vegetable or animal fat.

Potatoes.—Cost varies :—

From	...	...	3s.	6s.	9s.	11s.	18s.	20s.
To	...	...	5s.	8s.	10s.	15s.	—	—
No. of Hospitals	...	...	15	50	21	5	3	1

The cost per cwt. varies from 1s. $7\frac{1}{2}d.$ to 10s. Here again the variation in cost is due to the practice of invoicing potatoes supplied from the farm to the hospital at prices not in accord with current local market rates. For either transfer in large quantities from farm, or purchase from market, £10 per ton is an absurdly high rate.

Dried Fruit.—Cost varies :—

From	...	...	12s.	15s.	18s.	21s.
To	...	...	14s.	17s.	20s.	28s.
No. of Hospitals	...	...	19	38	25	13

The price for raisins ranges from $4\frac{3}{4}d.$ to 1s. $8d.$ per lb., a difference that is probably due to the variation in quality of the samples shown to contractors, or to the description given in the contract schedule.

Vegetables.—Cost varies :—

From	...	...	5s.	11s.	16s.	21s.	26s.	42s.
To	...	...	10s.	15s.	20s.	25s.	30s.	46s.
No. of Hospitals	...	34	29	15	8	5	4	

Prices for greens vary from 11*d.* to 37*s.* 4*d.* per cwt., and other vegetables from 4*s.* 8*d.* to 28*s.* per cwt. Needless to say, the larger figures are not current local market rates, or anything approaching thereto. The prices charged for articles supplied from hospital farms should of course represent current local market figures. It is probable that in many instances prices are unduly inflated in order to show a profit on farm management. A hospital farm is essential to guarantee the supply of good fresh food, to render its parent institution to some extent independent of industrial disputes, and to provide healthy occupation for patients. Whether or not it can be conducted to show a book profit is, we think, a matter of minor importance.

Beverages.—Cost varies :—

From	...	...	26s.	31s.	36s.	41s.
To	...	...	30s.	35s.	40s.	47s.
No. of Hospitals	...	37	39	13	6	

The price per lb. of tea varies from 1*s.* 10½*d.* to 2*s.* 5*d.*, of coffee from 1*s.* 1½*d.* to 2*s.* 5*d.*, and of cocoa from 4¾*d.* to 2*s.* 0½*d.* The variation in cost is no doubt due to quality obtained, and the method adopted of procuring supplies. The decline in the popularity of cocoa as a beverage is not surprising if authorities are satisfied with material obtained at 4¾*d.* per lb.

Milk.—The main supply is obtained from hospital farms, and the price at which it is invoiced to institutions varies from 9*d.* to 2*s.* 6*d.* per gallon—a difference in cost that cannot be justified.

Sugar.—Cost varies :—

From	...	...	23s.	31s.	36s.	41s.
To	...	...	30s.	35s.	40s.	48s.
No. of Hospitals	...	8	36	40	11	

The price per cwt. ranges from 38*s.* 9*d.* to 65*s.* 4*d.*, due no doubt to difference in quality obtained and variations in contract specifications.

Cereals.—Cost varies :—

From	...	...	25s.	31s.	36s.	42s.
To	...	...	30s.	35s.	40s.	—
No. of Hospitals	...	12	65	15	3	

Here again the different prices are doubtless due to the varying qualities obtained, and differences in the terms of contract specifications.

Jam.—Cost varies :—

From	...	...	8s.	11s.	14s.	17s.
To	...	...	10s.	13s.	16s.	20s.
No. of Hospitals	...	38	34	15	8	

Prices range from 37*s.* 4*d.* to 70*s.* per cwt. Some of the lower prices may be based on the cost of home manufacture, the variation generally being due to difference in quality.

